

Part 147 Aviation Maintenance Technician Schools

This edition replaces the existing loose-leaf
Part 147 and its changes.

This FAA publication of the basic Part 147, effective September 17, 1962,
incorporates Amendments 147-1 through 147-5 with preambles.

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Bold brackets [] throughout the regulation indicate the most recent changed or added material for that particular subpart. The amendment number and effective date of the new material appear in bold brackets at the end of each affected section.

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Part 14 of the Code of Federal Regulations. The amendment is a part of the program of the Federal Aviation Agency to recodify its regulatory material into a new series of regulations called the "Federal Aviation Regulations" to replace the present "Civil Air Regulations" and "Regulations of the Administrator".

During the life of the recodification project, Chapter I of Title 14 may contain more than one Part bearing the same number. To differentiate between the two, the recodified Parts, such as the ones in this subchapter, will be labeled "[New]". The label will of course be dropped at the completion of the project as all of the regulations will be new.

Subchapter H [New] was published as a notice of proposed rulemaking in the Federal Register on April 19, 1962 (27 F.R. 3756), and circulated as Draft Release 62-16.

Some of the comments received recommend specific substantive changes to the regulations. Although some of the recommendations might, upon further study, appear to be meritorious, they cannot be adopted as a part of the recodification program. The purpose of the program is simply to streamline and clarify present regulatory language and to delete obsolete or redundant provisions. To attempt substantive change (other than minor, relaxatory ones that are completely noncontroversial) would delay the project and would be contrary to the ground rules specified for it in the Federal Register on November 15, 1961 (26 F.R. 10698) and Draft Release 61-25. However, all comments of this nature will be preserved and considered in any later substantive revision of the affected Parts. As a result, with one exception, no change has been made in the substance of the rules contained in the notice of proposed rulemaking. The exception is a clarification and relaxation of the rule relating to work performed off station by repair stations. A new subparagraph (d) has been added to section 145.51 to make it clear that a certificated repair station may under quality controlled circumstances perform maintenance or alteration at a place other than the repair station. One other major change, although not substantive, is the deletion of policy material formerly contained in CAM sections 53.40-1 and 53.41-1 relating to the details of mechanic school curricula, and their replacement by language based on CAR sections 53.40 and 53.41. The deleted material was not mandatory and will be considered for inclusion in the Agency Advisory Circular System.

Other comments received suggested changes in style or format or in technical wording. These comments were carefully considered and, where consistent with the style, format, and terminology of the recodification project, were adopted.

The definitions, abbreviations, and rules of construction contained in Part 1 [New] published in the Federal Register on May 15, 1962 (27 F.R. 4587) apply to the new Subchapter B.

Interested persons have been afforded an opportunity to participate in the making of this regulation, and due consideration has been given to all relevant matter presented. The Agency appreciates the cooperative spirit in which the public's comments were submitted.

In consideration of the foregoing, Chapter I of Title 14 is amended by deleting Parts 50, 51, 52, 53, and 54 and by adding Subchapter H [New]* reading as hereinafter set forth, effective September 17, 1962.

This amendment is made under the authority of sections 313(a), 314, 601, and 607 of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a), 1355, 1421, and 1427).

Amendment 147-1

Cross Reference Corrections in FAR Parts 61, 65, 141 and 147

Adopted: April 4, 1967

Effective: April 10, 1967

(Published in 32 F.R. 5770, April 11, 1967)

These amendments update certain cross references in the Federal Aviation Regulations and make other miscellaneous corrections.

* Includes Part 141—Pilot Schools [New], Part 143—Ground Instructors [New], Part 145—Repair Stations [New], Part 147—Mechanic Schools [New], Part 149—Parachute Lofts [New].

In addition, the term "Federal Air Surgeon" is substituted for the term "Civil Air Surgeon" in § 11.55 to correctly state the title of that official.

Since this amendment does not involve any substantive change and does not impose a burden on any person, notice and public procedure thereon are unnecessary, and the amendment may be made effective immediately.

In consideration of the foregoing, Chapter I of Title 14 is amended, effective April 10, 1967.

These amendments are made under the authority of section 313(a) of the Federal Aviation Act of 1958 (49 U.S.C. 1354(a)).

Amendment 147-2

Name, Operations, and Curriculum

Adopted: March 27, 1970

Effective: May 3, 1970

(Published in 35 F.R. 5331, April 3, 1970)

The purpose of these amendments to Part 147 of the Federal Aviation Regulations is to change the name of mechanic schools certificated under that Part to "aviation maintenance technician schools"; provide more specific guidelines for the certification and operations of these schools; and provide new minimum curriculum requirements, for both certification and operations purposes, that reflect technological advancements of the aviation industry. The amendments to Part 65 reflect the changed name of the schools, and remove inconsistent or obsolete provisions.

Interested persons have been afforded an opportunity to participate in the making of these amendments by a notice of proposed rule making (Notice 69-6) issued on February 26, 1969, and published in the Federal Register on March 4, 1969 (34 F.R. 3751). Due consideration has been given to all comments presented in response to that Notice.

Fifty-nine comments were received on the Notice, the majority of which favored the proposals. A number of the comments either objected to particular items proposed, or suggested alternatives.

(1) *Change in name.* As proposed in the Notice, these amendments substitute the designation "aviation maintenance technician school" for "mechanic school" in the title and text of Part 147. Most of the commentors favored this change of name, stating that it will reflect a more professional image and be more descriptive of the mechanic's job in today's advanced technology. One commentor proposed adding the phrase "FAA approved course" to distinguish this course from non-approved courses. However, this change is considered to be unnecessary.

(2) *More specific guidelines for certification and operations of schools.*

(a) *As to certification.* Two commentors opposed eliminating the requirement for test clubs for running-in engines, in § 147.15, asserting that test clubs are required to properly perform certain engine maintenance testing functions. The reason given in the Notice for the proposed rule change is that current engine manufacturers' overhaul procedures do not require using test clubs for running-in engines after overhaul. It was not intended to preclude the use of test clubs in properly performing engine maintenance testing functions. However, to avoid possible confusion and accommodate the use of test clubs, where related to schools' specific curriculum in use, the term "suitable facilities for running engines" is substituted in these amendments for the proposed requirement of "separate space with permanent, portable, or mobile test stands."

Four commentors disapproved of the use of the word "suitable" (proposed for use in additional paragraphs of § 147.15), asserting that the word lacks specificity and therefore is subject to a wide range of individual interpretations. The term "suitable" has previously appeared in six paragraphs of this section. As issued, the Notice merely proposed application of this flexibility to the other requirements for facilities and equipment.

A number of comments were directed to the proposal that under § 147.23 a school must provide at least one instructor, holding appropriate mechanic certificates and ratings, for each 25 students in each shop or laboratory class. Thus, one commentor suggested that the ratio be no more than 20 students to one instructor in theory classes and 12 students to one instructor in shop and laboratory classes, asserting that a ratio of 25 students to one instructor in a shop or laboratory class is too many students for the instructor to control. On the other hand, several commentors opposed any limitation of this kind, characterizing it as too restrictive. The decision to have a specified ratio of students to instructors resulted from research and study, as well as from practical experience. The 25 to 1 ratio represents an upper limit, and it is not meant to suggest an ideal ratio. In fact, some schools normally employ ratios ranging from 20 to 1 down to 12 to 1.

(b) *As to operations.* Most of the commentors agreed with the proposed amendments to § 147.31 providing that a school may not credit a student with training received at that school prior to certification, and that a student may receive credit for previous experience to the extent that the experience is comparable to the required curriculum subjects. A few commentors disagreed. However, as stated in the Notice, this amendment should encourage schools to seek certification without delay.

A large number of commentors favored the proposed amendment to § 147.31 requiring schools to use an approved system for determining final course grades, and for recording and controlling student attendance. Some commentors expressed concern that the FAA standard of acceptability might not be standard among all inspectors; or that it is difficult to have a rigid accounting of student class attendance at a collegiate type school.

The proposed changes, requiring only that each school establish an approved system that is capable of controlling and recording attendance, without complete standardization, is considered sufficient to assure uniformity, as stated in the Notice.

A number of comments concerned the proposal to add to § 147.31 a provision that a school may not allow a student to attend classes of instruction more than 8 hours in any day or more than 6 days or 40 hours in any 7-day period. Several commentors asserted that this provision would prevent the student from attending makeup sessions, and other comments asserted that it would be desirable to allow the schools to give instruction for 48 hours in any 7-day period, as many students do not work and can carry the load. Other commentors suggested that the only limitation on student attendance should be the student's ability to maintain a 70% grade in all required subjects, or that students should not be allowed to receive course credit for attendance at courses other than during regularly scheduled hours of instruction, or that it should be possible to make up absences occurring because of sickness, strikes, holidays, and snow days. After further consideration, and in view of the comments and the fact that the schools may not require a student to attend classes of instruction for more than a specified number of hours, it has been determined not to implement this proposal.

Three commentors on the proposal to strike from § 147.35 the present requirement that the certificate issued (whether a certificate of completion or graduation) show the student's average grades, but to provide that the certificate reflect the student's standards of performance during the entire curriculum, asserted that such a showing is unnecessary since such a record is available from other sources. After further consideration and in view of these comments, it has been determined not to require the certificate to show either the average grades or standard of performance.

(3) *Minimum curriculum requirements.* The majority of the commentors agreed with the proposal, by amendments to § 147.21 and addition of appendices, to increase the number and type of items and subjects taught, and to indicate the levels of proficiency at which the items of subjects must be taught. Several comments questioned whether the general curriculum subjects must be taught as a separate curriculum from the airframe and powerplant curriculum subjects. This is not intended. The purpose of listing the general curriculum subjects separately is merely to avoid repetition.

A number of commentors opposed increasing the required number of hours of instruction. Principal comments stated that post-graduate high schools, technical institutes, and community colleges that operate on a 2-year curriculum would have problems with the increase in curriculum hours; and that the requirement that the curriculum show the required practical projects to be completed will be hard to enforce, and

and the degree of industry training involved. A National Advisory Committee, consisting of 15 members representing a broad segment of the aviation community, assisted in determining the tasks to be performed and the level of proficiency required of a student at a certificated school.

After careful review of all these suggestions, Appendix A is adopted as proposed. Appendix B is adopted with a change under the subject "Basic Electricity" that strikes out the words "conductivity and," so that the sentence reads "calculate and measure electrical power." Appendix C is adopted with the following changes: Item 36 is redesignated as Item 37 and the teaching level is raised to level 2, Item 37 is redesignated as Item 36 and the teaching level remains at level 1. Appendix D is adopted with one change: the teaching level of Item 1 is changed from level 2 to level 1.

The Notice proposed that each school have a maximum of 2 years from the effective date of these amendments to change to the new curriculum. Two commentors felt that a 2-year period would be inadequate for a school to decide whether it desires to retain its certification, and suggested a 5-year period. However, the 2-year period is considered a sufficiently long period for the purpose.

The amendments to Part 65 remove obsolete or inconsistent provisions. These amendments are minor in nature, effect no substantive change and are ones in which the public is not particularly interested. Notice and public procedure thereon are therefore unnecessary. The words "certificated mechanic school" are changed to "aviation maintenance technician school" in §§ 65.77 and 65.80, to conform with the new name in Part 147. In addition, these amendments add the words "or a certificate of completion" after the words "graduation certificate" in § 65.77 to conform with the change in Part 147. Also, the words "final phase of his training in the course curriculum" in § 65.80 are changed to "final subjects of his training in the approved curriculum" to conform with the change in Part 147.

In consideration of the foregoing, Parts 65 and 147 of the Federal Aviation Regulations are amended, effective May 3, 1970.

(Sections 313(a), 601, and 607, Federal Aviation Act of 1958; 49 U.S.C. 1354(a), 1421, 1427. Section 6(c) of the Department of Transportation Act; 49 U.S.C. 1655(c)).

Amendment 147-3

Operations Review Program

Amendment No. 1: Clarifying and Editorial Changes

Adopted: October 20, 1976

Effective: November 29, 1976

(Published in 41 F.R. 47227, October 28, 1976)

The purpose of these amendments is to incorporate into Parts 63, 91, 105, 121, 123, 129, 135, 145, and 147 of the Federal Aviation Regulations several clarifying and editorial revisions.

These amendments are based on a Notice of Proposed Rule Making (Notice 75-39), published in the FEDERAL REGISTER on December 8, 1975 (40 FR 57342) and are the first in a series of amendments to be issued as part of the First Biennial Operations Review Program.

Interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all comments presented. Several changes have been made to the proposed rules based upon the relevant comments received and subsequent review by the FAA. Those changes and comments are discussed below, and except for those changes, the reasons for the amendments remain the same as contained in Notice 75-39. The following discussion is keyed to the like-numbered proposals contained in Notice 75-39.

Proposal 1. Addition of class ratings to flight engineer certificates is presently controlled by § 63.33 and hence the proposed revision to § 63.45 would create a redundancy. As the applicable dates have passed, § 63.45 is no longer operative and therefore it is being deleted.

Proposal 27. This proposal to amend § 127.433(c)(1)(i) was intended to clarify the existing rule. Several commentors noted that the intended clarification had the opposite effect. Therefore, this proposal is being withdrawn to allow further study to determine whether a clarification is necessary and how best to accomplish it.

Proposal 39. One commentator opposed the addition of paragraph (b) to § 135.67 on the basis that it would be physically impossible for the pilot in command to make the determination that the inspections required under § 91.217 have been made. In light of this comment and the fact that review of Part 135 is presently underway, this proposal is being withdrawn from consideration at this time.

Proposal 41. One commentator pointed out that the preamble did not speak to this proposal to amend § 135.138(b). The only change effected by this proposal is to correct the reference to revised Part 61. The commentator also objected to use of the words "related advisory circulars." As those words are contained in the current rule and removal would amount to a substantive change, the comment is beyond the scope of this regulatory action.

Proposals 43 and 44. One commentator stated, "The deletion of section § 135.144a leaves the proposed rule incomplete in that FAR 23.1(a) applies to airplanes of nine seats or less and therefore no provisions are given for this in § 135.144 as proposed." Such is not the case. The change to § 135.144 and the deletion of § 135.144a will in no way affect current substantive requirements for aircraft of nine seats or less. Section § 135.144, as its title indicates, imposes additional requirements for airplanes carrying 10 or more passengers.

The commentator also noted substantive objections to § 135.144 and noted that no substantive discussion of the proposed change was included in the notice. Since the proposed rule change was nonsubstantive, it was not addressed in the preamble other than to note that an editorial change was being proposed. Substantive objection to the provisions of § 135.144 are beyond the scope of this regulatory action.

Proposals 48, 49, 50, and 51. Comments received on these proposals to make several changes to Part 137 indicate that further study is appropriate. The proposals are being withdrawn and will be addressed in a later notice.

Proposal 53. One commentator suggested that the phrase "or equivalent" be added after "inspection procedures manual" in proposed § 145.45(f) since several air carriers holding repair station certificates utilize different titles for their manuals. The intent of the regulation is not to require a manual of specific title but a manual of specific content. Therefore, to preclude confusion, the language is changed to "a manual containing inspection procedures".

These amendments are made under the authority of secs. 307, 313(a), 601, 603, and 607, Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354(a), 1421, 1423, and 1427), and sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).

In consideration of the foregoing, and for the reasons stated in Notice No. 75-39, Parts, 63, 91, 105, 121, 123, 129, 135, 145, and 147 of the Federal Aviation Regulations are amended effective November 29, 1976.

The Federal Aviation Administration has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

(Published in 43 FR 22636, May 25, 1978)

SUMMARY: The purpose of these amendments is to update and improve regulations concerning aircraft maintenance, airmen certification, and general operating and flight rules, parachuting, certification and operation of air carriers and commercial operators, air travel clubs, agricultural aircraft operations, repair stations, and aviation maintenance technical schools. These amendments are part of the Operations Review Program.

FOR FURTHER INFORMATION CONTACT: Mr. D. A. Schroeder, Safety Regulations Division, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591: telephone: 202-755-8715.

SUPPLEMENTARY INFORMATION:

HISTORY

These amendments are the fourth in a series of amendments to be issued as a part of the Operations Review Program. The following series of amendments have previously been issued as part of the Operations Review Program:

<i>Title</i>	<i>FR Citation</i>
Clarifying and editorial changes	(41 FR 47227; October 28, 1976).
Rotorcraft External-Load Operations	(42 FR 24196; May 12, 1977 amended by 42 FR 32531; June 27, 1977).
Airspace, Air Traffic and General Operating Rules	(To be issued at a later date).

These amendments are based on a Notice of Proposed Rule Making (Notice 76-28) published in the Federal Register on December 27, 1976, (41 FR 56280). All interested persons have been afforded an opportunity to participate in the making of these amendments and due consideration has been given to all matters presented. A number of substantive changes and changes of an editorial and clarifying nature have been made to the proposed rules based upon relevant comments received and upon further review by the FAA. Except for minor editorial and clarifying changes and the substantive changes discussed below, these amendments and reasons for their adoption are the same as those contained in Notice 76-28.

Five proposals which were contained in Notice 76-28, pertaining to Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft, are not being dealt with here. They will be considered in conjunction with the proposals contained in Part 135 Regulatory Review Program, Notice No. 77-17: Air Taxi Operators and Commercial Operators (42 FR 43490; August 29, 1977).

Amendments to § 121.343(d), § 121.359(e), § 121.703(f), § 127.127(d), and § 127.313(f) were not included in Notice 76-28. Since these amendments are editorial changes which reflect the National Transportation Safety Board's revised regulations, they are included in this amendment.

DISCUSSION OF COMMENTS

The following discussion is keyed to the like-numbered proposals contained in Notice 76-28.

Proposal 4-1. One commentator suggested that the word "knowingly" be inserted between "may" and "make" in paragraph (a) of proposed § 43.12 to clarify the intent behind the meaning of the word "fraudulent". The FAA does not believe it is necessary to add the word "knowingly" since the proof of a fraudulent act is based on the person knowingly committing the act. Accordingly, the proposal is adopted without substantive change.

Proposal 4-2. No unfavorable comments were received on the proposal to revise paragraph (b)(2) of Appendix E to Part 43. Accordingly, the proposal is adopted without substantive change.

After further review of paragraph (a), Appendix F to Part 43, the FAA believes the words "of the system" should be inserted between the words "frequency" and "is" to clarify that the antenna should be used during the transponder frequency check. Accordingly, proposed Appendix F to Part 43 is adopted as proposed except for the revisions discussed above.

Proposal 4-4. One commentor was against extending the effective date of a temporary certificate from 90 days to 120 days and suggested that the FAA's certificate handling facilities should be improved to provide more rapid service. The FAA believes that an addition of 30 days is necessary to handle the numerous applications received and to avoid the need for applicants to obtain rental of the temporary certificate. The proposed change to § 61.17(a) with respect to inserting the number "120" in place of "90" was also proposed for § 63.13 and § 65.13 (Proposals 4-5 and 4-11 respectively) and commented on as above. Accordingly, proposed §§ 61.17(a), 63.13 and 65.13 are adopted without substantive change.

Proposal 4-5. For a discussion of comments related to the proposal to amend § 63.13 and for the disposition of that proposal, see Proposal 4-4.

Proposal 4-6. A comment was received which discussed matters not proposed in Notice 76-28. This comment is beyond the scope of the Notice and cannot be considered without further notice and public participation. For a discussion of comments related to proposed § 63.41(b) and for the withdrawal of that proposal, see Proposal 4-12.

Proposal 4-7. No unfavorable comments were received on the proposal to delete § 63.53(b) and (c). Accordingly, the proposal is adopted without substantive change.

Proposal 4-8. No unfavorable comments were received on the proposal to amend § 63.57(a) and therefore it is adopted without substantive change. However, the FAA believes the words "any part of" and "except the section on plotting and computing" in § 63.57(b) should be deleted since they are rendered unnecessary by the amendment to § 63.53 (see Proposal 4-7). Accordingly, the words discussed above are deleted from § 63.57(b).

Proposal 4-9. No unfavorable comments were received on the proposal to revise § 63.59(b) or (c) and the proposal is adopted without substantive change. For comments related to proposed § 63.59(a)(2) and deletion of the phrase "in the case of applicant's first failure" in proposed § 63.59(a)(2), see Proposal 4-12.

Proposal 4-10. Although there were no unfavorable comments to the proposed revision of Appendix A of Part 63, the FAA believes the proposal should be withdrawn since a substantial portion of the rule was inadvertently omitted. Accordingly, the proposal to revise Appendix A of Part 63 is withdrawn.

Proposal 4-11. For a discussion of comments relating to the proposal to amend § 65.13 and for the disposition of that proposal, see Proposal 4-4.

Proposal 4-12. Thirty-nine comments objected to the proposed amendments to § 65.19. Many commentors objected to limiting the number of retests to one within 30 days as proposed in § 65.19(b) in case of an applicant's first failure. These commentors stated that this restriction could place an unnecessary burden on applicants by increasing the time for certification without a commensurate increase in benefits or safety. Upon further review, the FAA agrees and the phrase "In the case of an applicant's first failure" in proposed § 65.19(b) is deleted.

The proposed change to § 65.19(b) with respect to the phrase "In the case of an applicant's first failure" is identical to the proposed change to §§ 63.41(b) and 63.59(a)(2) in Proposals 4-6 and 4-9 respectively. Accordingly, the proposed change to § 63.41(b) is withdrawn and the proposed change to § 63.59(a)(2) is amended to delete the above phrase.

Several commentors objected to proposed § 65.19(b) because it denied certified ground instructors the privilege of giving additional instruction to applicants in preparing them for retesting. The commentors stated that ground instructors were the only persons, other than flight instructors, who have been tested on their ability to teach various technical subjects. The FAA does not issue ground instructor ratings which are appropriate to teach air traffic control tower operator, aircraft dispatcher, parachute rigger, or mechanic applicants.

Proposal 4-13. One commentor believed § 91.8 should be further expanded to include the prohibition against the interference with flight crewmembers before the aircraft is boarded. Since such a prohibition would be difficult to enforce and could give rise to jurisdictional problems, the FAA does not consider this prohibition a proper subject for rulemaking.

One commentor stated that proposed § 91.8(b) could apply to an aircraft owner who might ask the pilot to alter course or change destination. The commentor suggests clarifying the language. Another commentor expressed concern for the proposed wording of § 91.8(b) since it appears that a pilot examiner could be in violation by asking a private pilot applicant to divert from a course during a flight test. This was not the FAA's intent. The prohibition was directed toward unreasonable requirements, such as hijacking or requiring a change under duress. However, after further review, the FAA believes § 91.8(b) is not necessary since these acts are provided for in § 91.8(a). Accordingly, the proposal is adopted with the revisions discussed.

Proposal 4-14. No unfavorable comments were received on the proposal to revise § 91.15(a)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4-15. No unfavorable comments were received on the proposal to amend § 91.17. Accordingly, the proposal is adopted without substantive change.

Proposal 4-16. No unfavorable comments were received on the proposal to revise § 91.18(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4-17. No unfavorable comments were received on the proposed revision to § 91.43(b). Accordingly, the proposal is adopted without substantive change.

Proposal 4-18. One commentor disagreed with the proposed revision to § 91.52(d)(2) that would require the new expiration date for replacement (or recharge) of the emergency locator transmitter's battery to be entered in the aircraft maintenance record and suggested the use of a placard located inside the cabin as a better solution. The FAA believes that a maintenance record entry is a more reliable method of determining the replacement date than a placard. Accordingly, proposed § 91.52(d)(2) is adopted without substantive change.

Proposal 4-19. Several commentors contended that proposed § 91.73(d) could be too restrictive and does not allow sufficient discretionary authority to the pilot in command as to when the anticollision lights should or should not be lighted. They state that the use of a strobe light as an anticollision light would create an unsafe condition during certain aircraft operation such as taxiing, takeoff and landing, if the pilot did not have the option to turn it off except during adverse meteorological conditions.

In light of these comments and upon further review, the FAA agrees that there are instances when the use of a high intensity anticollision light could induce vertigo and cause spatial disorientation. Accordingly, § 91.73(d) is revised to provide that the pilot in command may turn off the anticollision lights at any time in the interests of safety.

Proposal 4-20. One commentor does not believe the word "nearest" in proposed § 91.83(d) conveys the operational procedure presently used by the FAA, and suggested it be changed. In light of this comment, and after further review, the FAA believes that any restrictive term is unnecessary and could possibly discourage the filing of flight plans. Accordingly, the words "the nearest" in proposed § 91.83(d) are deleted and the word "an" inserted.

Proposal 4-21. One commentor objected to the wording of proposed § 91.173 on the ground that it places an unwarranted burden on the owner or operator to determine such items as revision date, airworthiness directive (AD) number, and if an AD involves recurring action, the time and date when the next action is required. The commentor further stated that § 91.173 places responsibility on the owner or operator for the content of Part 43 maintenance record entries made by persons authorized by the FAA.

The FAA believes that the owner or operator should be responsible for the retention of the required maintenance records for the specified periods and furnish such records to the person authorized by the FAA to accomplish the work. The FAA believes that the owner or operator should also ensure that the appropriate information as prescribed in § 91.173 is entered in the maintenance records. The intent of the proposal is to require the retention of more specific information relating to ADS and their compliance.

§ 25.141(g) adequately covers inline attachment. Accordingly, proposed § 91.169(b)(5) is adopted without substantive change.

Proposal 4-23. The only public comment received on the proposal to amend paragraph 2(a)(7) of Appendix A to Part 91 recommended that radio altimeters be included in the proposed requirement but gave no further explanation. Since radio altimeters have markings at 20 feet or less intervals, the FAA believes that no reason exists at this time to include them in this amendment. Accordingly, the proposal is adopted without substantive change.

Proposal 4-24. No unfavorable comments were received on the proposal to revise § 105.15(b). Accordingly, the proposal is adopted without substantive change.

Proposal 4-25. One commentator supported proposed § 105.33(a) and (b) providing adequate exceptions exist for emergency situations, but did not state what type of exceptions he was referring to.

Another commentator contends that a light should not be displayed during free-fall because such a light decreases night vision and could possibly induce vertigo or spatial disorientation.

The FAA does not believe that such a light would significantly decrease night vision and induce vertigo or spatial disorientation. The FAA believes that a parachute jumper presents an object in the airspace from the instant the jumper exits the aircraft until the jumper reaches the surface. All that changes with the deployment of the chute is the speed the object is falling. A free-fall jump can extend through thousands of feet of airspace, presenting a hazard to air navigation. Accordingly, in the interest of safety, proposed § 105.33(a) and (b) are adopted without substantive change.

Proposal 4-26. No unfavorable comments were received on the proposal to amend § 105.43. Accordingly, the proposal is adopted without substantive change.

Proposal 4-27. No unfavorable comments were received on the proposal to revise § 121.11. Accordingly, the proposal is adopted without substantive change.

Proposal 4-28. No unfavorable comments were received on the proposal to amend § 121.26. Accordingly, the proposal is adopted without substantive change.

Proposal 4-29. No comments were received on the proposal to revise § 121.29(b). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 121.29(b) is withdrawn.

Proposal 4-30. No unfavorable comments were received on the proposal to amend § 121.47(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4-31. No comments were received on the proposal to revise § 121.53(e). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 121.53(e) is withdrawn.

Proposal 4-32. No favorable comments were received on the proposal to revise § 121.61(b)(1). Accordingly, the proposal is adopted without substantive change.

Proposal 4-33. No unfavorable comments were received on the proposal to amend § 121.135(b)(6) and (7). Accordingly, the proposal is adopted without substantive change.

Proposal 4-34. No unfavorable comments were received on the proposal to amend § 121.191(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4-35. The commentators to proposed § 121.309(b)(4) contend the proposal was unnecessarily redundant, served no useful purpose, and did not enhance safety. The commentators objected to this proposal from the standpoint that it would impose: (1) an unwarranted recordkeeping burden on operators utilizing an equipment control program that is controlled by hours or cycles and not by a specific inspection due date; (2) a risk of not having the inspection dates marked on the containers when equipment items were transferred from one airplane to another; and (3) an additional task of changing inspection dates with possible resultant error.

is more definitive and the proposed wording is retained. Another commenter objected to the proposal on the grounds that there are instances when it is acceptable for cockpit crewmembers to continue to smoke and stated that this determination should be left up to the discretion of the cockpit crewmembers. The FAA disagrees. As a safety factor, flight crewmembers should be prohibited from smoking when the "no smoking" sign is lighted. Accordingly, proposed § 121.317(a) and (b) is adopted without substantive change.

Proposal 4-37. No unfavorable comments were received on the proposal to amend § 121.401(c). Accordingly, the proposal is adopted without substantive change.

Proposal 4-38. No unfavorable comments were received on the proposal to revise § 121.440(b)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4-39. Two comments were received on both proposed §§ 121.548 and 127.212 which discussed matters not proposed in Notice 76-28. These comments are beyond the scope of the Notice and cannot be considered without further notice and public participation. Accordingly, proposed § 121.548 and § 127.212 (Proposals 4-39 and 4-54 respectively) are adopted without substantive change.

Proposal 4-40. No unfavorable comments were received on the proposal to amend § 121.651(d)(2). Accordingly, the proposal is adopted without change.

Proposal 4-41. No unfavorable comments were received on the proposal to amend § 121.652(a). However, as stated in the preamble to Notice 76-28, the FAA believes the flight time, in order to be credited, must be acquired in the same "type" airplane. Accordingly, the proposal is adopted by inserting the word "type" to further clarify the intent of the rule.

Proposal 4-42. No unfavorable comments were received on the proposal to amend § 121.697(e)(2). Accordingly, the proposal is adopted without substantive change.

Proposal 4-43. No unfavorable comments were received on the proposal to revise § 121.723(a) and (b). However, in order to avoid the reissuance of certificates at the conclusion of each assignment, the wording is changed so that the certificate is retained until termination of employment with the carrier or operator. Accordingly, the proposal is adopted with the change discussed.

Proposal 4-44. No unfavorable comments were received on the proposal to add a new § 123.11(b)(3). Accordingly, the proposal is adopted without substantive change.

Proposal 4-45. No unfavorable comments were received on the proposal to add a new § 123.12. Accordingly, the proposal is adopted without substantive change.

Proposal 4-46. No unfavorable comments were received on the proposal to revise § 123.13. Accordingly, the proposal is adopted without substantive change.

Proposal 4-47. No unfavorable comments were received on the proposal to revise § 123.15(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4-48. No comments were received on the proposal to revise § 123.19(c). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 123.19(c) is withdrawn.

Proposal 4-49. No unfavorable comments were received on the proposal to revise § 123.27. Accordingly, the proposal is adopted without substantive change.

Proposal 4-50. No unfavorable comments were received on the proposal to revise § 123.41(a)(1). Accordingly, the proposal is adopted without substantive change.

Proposal 4-51. No unfavorable comments were received on the proposal to revise § 127.3. Accordingly, the proposal is adopted without substantive change.

Proposal 4-52. No comments were received on the proposal to revise § 127.21(b). After further review, the FAA believes there is no current need for the proposed revision. Accordingly, proposed § 127.21(b) is withdrawn.

Accordingly, the proposal is adopted without substantive change.

Proposals 4-56 through 4-60. These proposals are included in the Part 135 Regulatory Review Notice 77-17: Air Taxi Operators and Commercial Operators (42 FR 43490; August 29, 1977). Comments received on the proposed amendments to Part 135 in Notice 76-28 will be considered in conjunction with other comments received in response to Notice 77-17.

Proposal 4-61. No unfavorable comments were received on the proposal to amend § 137.19(e). Accordingly, the proposal is adopted without substantive change.

Proposal 4-62. No unfavorable comments were received on the proposal to delete Part 149 "Parachute Lofts" and transfer those requirements to a new Subpart E in Part 145. However, after further review, the FAA believes the incorporation of Part 149 into Part 145 as proposed would create redundancy in the rules and cause confusion. Accordingly, the proposal to amend Part 145 is withdrawn.

Proposal 4-63. No unfavorable comments were received on the proposal to revise § 145.17(b). After further review, the FAA believes the words "surrendered, suspended, or," should be reinserted between the words "sooner" and "revoked" in § 145.17(b) since they appear in current § 145.17(b). This oversight is corrected in the adopted rule since it was not a change intended by the proposal. Accordingly, the proposal to revise § 145.17(b) is adopted as proposed except for the revision discussed above.

Proposal 4-64. No unfavorable comments were received on the proposal to amend § 145.59(a). Accordingly, the proposal is adopted without substantive change.

Proposal 4-65. No unfavorable comments were received on the proposal to revise § 147.31(c)(1) and to add a new § 147.31(c)(2). After further review, the FAA believes that the following editorial changes should be made: (1) in the proposed § 147.31(c)(1)(ii) the word "accreditation" is used in place of the word "certification" which appears in current § 147.31(c)(1). This oversight is corrected in the adopted rule since it was not the intent of the proposal to change the wording to accreditation; (2) the phrase "other than the crediting school" immediately following the word "accreditation" in proposed § 147.31(c)(1)(ii) was inadvertently omitted and has been included in the final rule. Accordingly, the proposal to revise § 147.31(c)(1) and to add a new § 147.31(c)(2) is adopted as proposed except for the revisions discussed above.

Proposal 4-66. Although there were no unfavorable comments to the proposed deletion and reservation of Part 149, the proposal is withdrawn for the reasons discussed in Proposal 4-62.

Drafting Information

The principal authors of this document are Thomas G. Walenta, Flight Standards Service, and Richard B. Elwell, Office of General Counsel.

Adoption of the Amendments

Accordingly, Parts 43, 61, 63, 65, 91, 105, 121, 123, 127, 137, 145, and 147 of the Federal Aviation Regulations (14 CFR Parts 43, 61, 63, 65, 91, 105, 121, 123, 127, 137, 145, and 147) are amended as follows, effective June 26, 1978.

(Secs. 313, 314, and 601 through 610 of the Federal Aviation Act of 1958 (49 U.S.C. 1354, 1355, and 1421 through 1430) and Sec. 6(c) of the Department of Transportation Act (41 U.S.C. 1655)).

Note.—The Federal Aviation Administration has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended by Executive Order 11949, and OMB Circular A-107.

SUMMARY: This amendment updates the regulations for certificating Aviation Maintenance Technician Schools (AMTS) to accommodate the increasing demand for maintenance technicians with higher levels of skill and knowledge. The amendment modifies portions of the rule that have been open to subjective judgments by the FAA and the AMTS industry and modifies the portions that specify the skill and knowledge requirements for an aviation maintenance technician. This amendment revises the core curriculum to ensure that AMTS graduates will be prepared to function in the current technological environment.

FOR FURTHER INFORMATION CONTACT: Leslie K. Vipond, AFS-302, Aircraft Maintenance Division, Flight Standards Service, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, D.C. 20591, telephone (202) 267-3269.

SUPPLEMENTARY INFORMATION:

Background

Part 147 (14 CFR Part 147) was adopted in 1970 and, except for some minor changes, has not been revised since that time. The civil aviation environment in which the aviation maintenance technician operates has changed significantly since that regulation was adopted. Thus, a person could graduate from a Part 147-approved AMTS and not be fully prepared to function in the current aviation environment.

In keeping with FAA policy to review and upgrade regulations to ensure that they are consistent with changes in the aviation environment, the FAA contacted the airlines, AMTS, repair stations, and mechanic organizations to consider holding joint industry/FAA public listening sessions to discuss proposed changes. The FAA held a series of three public listening sessions in 1988 and received significant input from the aviation industry. The first session was held in Atlanta, Georgia, on August 29-30, 1988; the second was held in Oklahoma City, Oklahoma, on September 8-9, 1988; and the third was held in San Jose, California, on September 15-16, 1988. The agenda of the listening sessions was based on questions from the AMTS and the airline industry. Information obtained during the listening sessions formed a basis for an outline of certain proposed changes for the rule. After the sessions, the FAA determined it was appropriate to consider modifications of the portions of the rule that govern AMTS curriculum, administration, and operating rule requirements. The FAA then developed and issued a notice of proposed rulemaking (NPRM) to amend Part 147 (55 FR 37416, September 11, 1990, Docket No. 26331, Notice No. 90-22).

This NPRM addressed and included proposals from both industry and the FAA. The notice was comprehensive and contained proposed revisions to nearly every section of Part 147. All interested persons were given an opportunity to comment on the proposals and due consideration has been given to all comments received.

Discussion of Comments

The FAA received 41 comments in response to the NPRM. These comments have been reviewed and considered by the FAA in the promulgation of this final rule. Twelve large industry groups, representing over 10,000 aviation businesses, corporations, AMTS, and individuals, enthusiastically support the NPRM. These groups, including the Aviation Technician Education Council, Air Transport Association of America, National Business Aircraft Association, and Professional Aviation Maintenance Association, participated in the public listening sessions and helped to identify important areas of reform early in this process. Essentially, their comments consist of general statements favoring all aspects of the NPRM, with some minor suggestions. The remaining comments consist of individuals who perform aircraft maintenance or schools involved in training. The comments are summarized and discussed below on a section-by-section basis. Only those sections commented upon are discussed.

Section 147.5(a) Application and issue.

The proposal to amend § 147.5(a), by removing the requirement of listing the subjects to be taught by each instructor and the requirement that applicants submit photographs of the facilities, received no adverse comments.

This section of the proposal removes the requirement for separate classroom and shop space, thus, providing schools with more flexibility in use of classroom and laboratory areas.

One commentor recommends that § 147.15(f) retain the words “assemble and test.” No additional clarifying information was submitted concerning this suggestion.

The FAA has determined that the words “assemble and test” have historically created confusion and misinterpretation of the intent of the regulation. For example, the space requirement for assembly and testing has often been interpreted to mean a separate “clean room” for engine assembly and testing following overhaul. The requirement to assemble and test in the AMTS environment is intended or necessary to train mechanics to a required standard, not to return a component to service. Therefore, in the AMTS, the space for disassembly, service, and inspection could be the same space used to assemble and test. Accordingly, § 147.15 is adopted as proposed.

Section 147.17 Instructional equipment requirements.

The proposed revision to this section requires that the applicant’s required instructional aircraft be fitted with navigation and communication (NAVCOM) equipment instead of the current requirement for a two-way radio.

Questions have been raised by two commentors concerning who would determine which type of NAVCOM equipment would be appropriate. The FAA’s current procedure for determining the acceptability of radio equipment in AMTS remains unchanged. The language here only upgrades the two-way communications radio requirement to include an additional navigational equipment component.

The FAA is of the opinion that this new requirement should not be a cause of confusion as the revision is only a minor extension of the current rule. Accordingly, § 147.17 is adopted as proposed.

Section 147.19 Material, tool, and shop equipment requirements.

The proposed revision to this section would eliminate the requirement that the AMTS must have an adequate supply of special tools and miscellaneous tools, and would require instead that the AMTS have an adequate supply of only those special tools that might be needed for such projects as engine assembly and calibration.

One commentor suggests that a list of minimum special tools be added and that there also be a clarification of who must provide handtools.

The FAA has determined that an additional explanation is not appropriate for regulations. Having a regulatory requirement for a list of minimum special tools would not serve any purpose since the quantity and type of special tools required would, in effect, be specified by the number of students being taught and the requirements of the instruction being received. As revised, § 147.19 provides more options to students and schools since the school is not required to provide handtools by regulation; then, either the student must provide them or the school may elect to supply them. The changes to § 147.19 are adopted as proposed.

Section 147.21 General curriculum requirements.

The proposed rule changes several elements of this section. First, an amendment to § 147.21(b) would permit schools, at their option, to use a 50-minute instruction unit hour, the standard at most educational institutions.

One commentor opposes this change stating that the change would reduce classroom time, while three commentors recommend that it be adopted. Another commentor suggests that the FAA require that the hours offered by a school be clarified. No additional information was submitted concerning this suggestion.

The FAA also proposed to remove § 147.21(e). This would thereby give schools greater flexibility in allocating student time between practical and theory-based instruction. This would eliminate the current requirement that 50 percent of the total curriculum time be spent in shop or laboratory classes.

Six commentors are opposed to this change, preferring that the 50 percent shop time requirement be kept. Three other commentors indicate that this requirement should not be applicable to general aviation.

owned part 147 AMTS as well. During the public listening sessions preceding the NPRM, nearly every participant was in favor of defining a minimum 50-minute instruction time period. Based on the foregoing, the FAA has determined that no degradation in safety would result and that a 50-minute unit would be appropriate.

With respect to the removal of the existing requirement for 50 percent of the students instructional time to be in shop, most of the public listening session participants and the FAA agree that this requirement is obsolescent. Because of the complexity of modern aircraft systems, the FAA has determined that more classroom instruction time should be spent learning the cognitive skills associated with understanding the theoretical fundamentals of these complex systems, as opposed to requiring instruction in curricula structured to emphasize the development of certain traditional "hands-on" tactile skills, such as woodworking and heat treating.

In any case, the requirement for the development of manipulative and shop skills are retained at levels 2 or 3, because subject teaching levels require the appropriate amount of shop or laboratory instruction time. The changes to § 147.21 are adopted as proposed.

Section 147.23 Instructor requirements.

The proposed rule would permit schools to use specialized personnel who are not FAA-certificated mechanics to teach a wider variety of fundamental technical subjects. The proposal would provide the AMTS with a much larger pool of appropriately skilled and educated teachers from which to draw. The intent is to enable the AMTS to enhance the quality of education through the use of specialized instructors in certain general subjects without negatively affecting the quality of the instruction directly related to aviation maintenance subjects.

Several commentors suggest developing FAA standards for the specialized instructors and expanding the list of subjects that specialized instructors may teach. The development of standards for specialized instructors would be tantamount to requiring them to be certificated and is beyond the scope of this rulemaking. In addition, the commentors did not offer any rationale for expanding the list of subjects that the specialized instructors could teach. Accordingly, the FAA does not agree with these commentors and those proposals are not accepted.

Two commentors advocate dropping the term "similar subjects" from the list of subjects that specialized instructors may teach in order to avoid confusion. The FAA does not agree, because no evidence was put forward to suggest that the phrase "similar subjects" regarding instructor requirements in the current regulations does not provide sufficient instructor competence. In addition, by dropping that term, the list of specialized instructor privileges could grow to include virtually all non-aircraft maintenance related subjects. This may not provide appropriate instruction and could result in surveillance difficulties. The FAA has determined that the term "similar subjects" should be retained; this term adds clarity to the rule by defining the limitations of specialized instructors. Accordingly, § 147.23 is adopted as proposed.

Section 147.31 Attendance and enrollment, tests, and credit for prior instruction or experience.

This section, under the proposal, would be amended to replace references to the term "mechanic" with the term "aviation maintenance technician."

Two commentors oppose this change without explanation. The FAA disagrees with the commentors; the occupation descriptor "aviation maintenance technician" is consistent with not only the title of the rule itself but is congruent with the current terminology of the aviation industry and the International Civil Aviation Organization.

Several commentors believe that a student should be eligible to receive credit for the subject of mathematics regardless of how that knowledge is gained. The FAA has not proposed changing the prerequisite in the current rule that verification and possibly testing are required before a school may credit a student for previous instruction or experience. This requirement applies to all subjects, including mathematics. The commentors offered no evidence that the informal study of mathematics is as effective and comprehensive as formal instruction. Thus, § 147.31 is adopted as proposed.

AMTS. The proposed change would relieve this burden without any adverse impact on safety. Accordingly, the amendment to § 147.35(a) is adopted as proposed.

Section 147.36 Maintenance of instructor requirements.

Modifications to this section are similar to those proposed for § 147.23. These changes would permit the expanded use of instructors who are not certificated mechanics to teach certain subjects in the general curriculum.

As in § 147.23, several comments were received suggesting that the term "similar subjects" be dropped because it is vague and causes confusion. One respondent points out that the phrase "basis hydraulics" should be "basic hydraulics," while another indicates that the word "each" should be "teach."

The comments received regarding "similar subjects" for this section are congruent with those received in § 147.23, and the FAA has determined that the term "similar subjects" should be retained since it is adequately clear and provides the flexibility needed. The phrase "basis hydraulics" was a misspelling and will now read "basic hydraulics," and the word "each" was a misspelling and will now read "teach." With the exception of these changes, § 147.36 is adopted as proposed.

Section 147.38 Maintenance of curriculum requirements.

No comments were received on the proposed changes to this section; therefore, § 147.38 is adopted as proposed.

APPENDIX A Curriculum Requirements

The proposed rule would add a paragraph (c) to this appendix to facilitate the use by AMTS of currently accepted educational materials and equipment, such as computers, calculators, and audiovisual equipment.

Part of the proposal relating to Appendix A teaching levels (Part 147, Appendix A, Section (b)(3)(ii)), replaces the term "accomplish" with "simulate." The proposal for this section will now read "Development of sufficient manipulative skills to simulate return to service."

A commentator states dissatisfaction with the proposed term "simulate" when training to level 3. The FAA disagrees with the comment, because while much of the training equipment in typical Part 147 AMTS may no longer be in airworthy condition; i.e., engines, generators, etc., sufficient manipulative skills may be developed and sufficient knowledge may be acquired on the training equipment to simulate the accomplishment of return to service even if the training equipment itself is not airworthy.

Another commentator proposes a change to Appendix A, Section (a), *Definitions*. The commentator suggests that Section (a)(5) should read: "'Repair' means to correct a defective condition *by acceptable means*." The FAA disagrees. The commentator's suggestion could cause confusion in the definition of repair since the purpose of a Part 147 school is to provide instruction in FAA acceptable methods and practices for all tasks. The FAA does not choose to adopt the comment "by acceptable means." Accordingly, the FAA adopts Part 147, Appendix A, as proposed.

APPENDIX B General Curriculum Subjects

The proposal adds both new material and changes teaching levels in certain subjects. The purpose of these changes would be to increase students' exposure to technical information and special skill requirements that are more relevant to the current aviation industry needs and to reduce required instruction time in certain obsolescent areas.

Several commentators suggest that the subject area "basic physics" be renamed as "basic science." The FAA disagrees. The subject of "basic science," which might include science subjects such as biology, zoology, etc., could be far less relevant than the more rigorously defined subject "basic physics." Basic physics encompass the more applicable principles of fluids, air, heat, and mechanical forces which are more appropriate to the studies of AMT students.

Another commentor advocates inclusion of a requirement in this section concerning the use of typical aircraft maintenance records to emphasize mechanic responsibility. This was echoed by a commentor who suggests expanding the teaching section on maintenance forms, Subject Item 28, and requiring a student to develop the description of work performed as specified in §§43.9 and 43.11 and not just describe various discrepancies. The FAA agrees with both commentors. Appendix B, Subject Item 28, has been modified by adding the words: "Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records."

Another commentor proposes that the teaching level for dye penetrant non-destructive inspection (NDI) be raised from level 2 to level 3. The FAA disagrees with this suggestion. All NDI training, including the use of dye penetrants, to a teaching level 3 competence clearly requires significant training beyond that which could reasonably be expected of an AMTS, given the time constraints imposed by other training requirements. Therefore, the FAA has not adopted this suggestion.

Several commentors recommend keeping heat treating processes at level 2 rather than dropping them to level 1. The FAA does not agree with those commentors. The complexities of today's aircraft structures require that greater emphasis be placed on fundamental and theoretical understanding of metallurgical materials and processes developed at teaching level 1 rather than requiring AMTS training to focus on the hands-on skills developed at teaching level 2. Note that in the final rule the word "inspect" is added at the beginning of the subject area description of subject item 23. This term emphasizes that a requirement to inspect for corrosion necessarily and logically precedes the identification, removal, and treatment of affected areas. Appendix B, therefore, is adopted in accordance with the changes to the NPRM as discussed.

APPENDIX C Airframe Curriculum Subjects

The proposed amendment to this appendix would add a subject area on composite aircraft structural inspection, testing, and repair as well as delete and reduce certain obsolescent material in some subject areas such as wood, dope, and fabric. Curriculum offerings would be increased in certain current and newly emerging areas of technology and some teaching levels would increase.

Subject Item 50

Five commentors believe that the requirement in Subject Item 50 for teaching the troubleshooting and repair of constant speed drive (CSD) and integrated speed drive (ISD) generators at teaching level 3 is too high. They argue that the teaching of these systems at level 3 would present a significant economic burden to the majority of AMTS since this would require all schools to purchase at least one operating model of each type of generator at a considerable cost. Further, they argue that a satisfactory understanding of these systems may be simulated by alternative teaching methods that do not require the actual hardware.

After assessment of the alternatives, the FAA agrees with the comments and finds that the economic burden of acquiring this hardware is not justified. Following further study, the FAA agrees with the commentors that there are alternate methods available to teach those systems to a satisfactory level. Further, the original teaching level of 3 for ISD and CSD generating systems is unjustified with respect to the needs of industry, and it is more appropriate at a level 1. However, the needs of the aviation industry dictate that the teaching level should remain at level 3 for alternating and direct current generating systems. As a result of further evaluation, the FAA has determined that this subject item will be subdivided into two parts and will read as follows:

Item 50(a), teaching level 3, Inspect, check, troubleshoot, service, and repair alternating current and direct current electrical systems.

Item 50(b), teaching level 1, Inspect, check, and troubleshoot constant speed and integrated speed drive generators.

Accordingly, this section is adopted as revised by the foregoing discussion.

Subject Item 20

Another commentor suggests that the FAA consider modifying Item 20, to reduce the arc welding and soldering requirement from teaching level 2 to level 1. The FAA does not agree with this commentor. None of the participants at the FAA's public listening sessions identified any need for change in this area, and the commentor presented no rationale for the proposal.

Subject Item 8

Another commentor suggests expanding Subject Item 8 from "apply finishing materials" to include generic types of materials, such as polyurethane and other current types of material. While this suggestion has merit, expansion of this section is not necessary. A properly developed and administered curriculum with a teaching level of 2 would include instruction in aircraft painting using the current types of generic preparation, priming, and finishing materials.

Subject Item 33

Two commentors note that the teaching level for item 33, heating, pressurization, etc., should be raised to level 2 since system components such as air cycle machines require frequent maintenance.

The FAA disagrees. The majority of the fault corrections involve either troubleshooting of circuitry or electromechanical devices. Appropriate analytical instruction can be delivered at the proposed teaching level 1 where basic principles and troubleshooting can be taught to the required knowledge level. In this case, the economic burden to the AMTS of acquiring the training equipment necessary to teach to a level 2 is not justified.

A single commentor believes that Subject Item 33 should include a warning about oxygen "danger aspects." The FAA has determined that this is not necessary since this subject is required to be taught at level 2 in Subject Item 35, and the oxygen system cautions and warnings subject must be taught as part of the curriculum.

Subject Item 51

One commentor believes that the language in Subject Item 51 describing "takeoff warning" systems should be changed to the more encompassing "configuration warning." The FAA agrees that this proposed language is more appropriate for the system description, and that phrase will be changed accordingly.

Subject Item 5

One commentor objects to Subject Item 5 being reduced to level 1. Subject Item 5 teaches the inspection, test, and repair of fabric and fiberglass cloth, a relatively obsolescent subject. The commentor gave no justification for the objection; however, much discussion in the FAA public listening sessions centered on the need to consider reduction of teaching levels in certain obsolescent subjects in order to liberate more instruction time to focus on subjects more relevant to today's needs.

The FAA has determined that sufficient knowledge may be gained on this subject at a teaching level 1 so that a student can be adequately trained to make appropriate repair judgments. Therefore, Appendix C is revised as proposed.

APPENDIX D Powerplant Curriculum Subjects

Under the proposal, new subject material would be added to this appendix to increase the level of technical knowledge and skill required in the powerplant curriculum. Certain teaching levels would be changed to reflect the current and future technician training needs. Another major change to Appendix B would require that each certificated AMTS have an operating jet turbine engine for instructional purposes. This proposal is implicit in the hardware requirements for Subject Item 6, to "Inspect, check, service, . . . turbine engine installations."

Subject Item 19

Five commentors suggested that Item 19, "Inspect, service . . . turbine engine electrical and pneumatic starting systems," be divided into two sections, with electrical turbine engine starting systems being

Another commentor recommends that the word "teaching" be used to clearly identify the system being taught as a starting system. The FAA agrees that sufficient basis exists to incorporate these suggestions. Accordingly, Subject Item 19 is modified and adopted as follows:

a. Item 19(a), Inspect . . . troubleshoot . . . turbine engine electrical starting systems (at teaching level 3).

b. Item 19(b), Inspect . . . and troubleshoot turbine engine pneumatic starting systems (at teaching level 1).

Subject Item 20

The proposed revisions to this subject item would eliminate training in obsolete subjects; one such subject is Subject Item 20, requiring instruction in powerplant water injection systems. This requirement was discussed at length during the Part 147 listening sessions. The FAA agrees that this technology is currently obsolete and applicable to relatively few aircraft, and instruction time could be more productively focused elsewhere. Two commentors suggest that this subject be retained at teaching level 1; however, sufficient justification was not presented, and the FAA does not agree with that suggestion. Therefore, this subject item is adopted as proposed.

Subject Item 6

During the listening sessions, both the FAA and most of the industry participants recognized and recommended that adequate training on turbine engine inspection, checking, and repair requires a turbine engine that is operational, and all operational training on this particular subject item, Item 6, should be at teaching level 3.

One commentor to the NPRM suggests that training on this item would be too complex at teaching level 3 and should be reduced to level 2. No economic justification or other basis was stated for the proposed to reduce the teaching level. The FAA disagrees. Accordingly, Subject Item 6 is adopted as proposed.

Subject Item 32

Under the current rule, this subject item is dedicated solely to the teaching of engine exhaust systems to teaching level 3. In the NPRM, it was proposed that this subject item be expanded to include the closely related subject of engine thrust reverser systems and related components. It was proposed and intended that this new subject be taught only to level 1. However, it was never intended that the current instruction in the repair and troubleshooting of engine exhaust systems be relaxed to teaching level 1. A relaxation of the teaching standard for engine exhaust systems generally would not be in the public interest, since improperly repaired exhaust systems could create a serious safety hazard. To make it absolutely clear that the current standard for this subject item is to be maintained, in the final rule the teaching of the repair of engine exhaust systems is separated from engine thrust reverser systems. The former is to continue to be taught to level 3, while the latter need only be taught to level 1. This subject item is subdivided into 32.a. (which employs the wording of current element 32) and 32.b., respectively.

Subject Item 40

Two commentors indicated that the newly added subject, Subject Item 40, Unducted Fans, be removed and that the subject material be incorporated into turbojet subject items. The FAA has determined that by placing the subject item, Unducted Fans, apart as a separate subject item, the subject may be taught more comprehensively when those systems enter service. Further, as that particular technology evolves, a separate instruction unit will provide some of the future AMTS curriculum growth potential that many commentors consider essential. Accordingly, Appendix D, is adopted as proposed in the NPRM.

Miscellaneous Comments

A number of comments of a very general nature were received. The majority of these comments primarily address the proposed upgrading of sections of the curriculum specifying airframe systems such as communication and navigation systems, cabin atmosphere control systems, and similar subject items. These comments generally characterize the proposals as being too "airline oriented and watering down

the aviation industry are in airline or airline-related occupations. Further, long-range statistical demographic surveys indicate that aircraft maintenance technician migration into airline employment is likely to increase over the next decade. In view of these trends, the FAA is of the opinion that, for reasons of safety and commerce, AMTS would be able to maximize productivity if required curriculum provides an increased focus on the instruction necessary to increase student training in the knowledge, skills, and abilities required by the airline industry. On the other hand, the FAA has determined that the proposed regulatory changes will not result in a negative effect on AMTS training for general aviation since much of the same procedures and equipment required by the airline industry are already incorporated into many general aviation aircraft. Therefore, based on these considerations, those comments do not reflect the broader needs of the aviation community.

A number of commentors express concern that the scope of the revised regulation would require that all AMTS be recertificated by the FAA. The FAA is of the opinion that no AMTS will be required to be recertificated to conform to the rule. The FAA will continue to conduct routine conformity surveillance inspections to assure compliance with this rule.

Paperwork Reduction Act

Information collection requirements in the amendments to Part 147 have previously been approved by the Office of Management and Budget under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511) and have been assigned OMB Control Number 2120-0040.

Regulatory Evaluation Summary

Executive Order 12291, dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if potential benefits to society for each regulatory change outweigh potential costs. The order also requires the preparation of a Regulatory Impact Analysis of all "major" rules except those responding to emergency situations or other narrowly defined exigencies. A "major" rule is one that is likely to result in an annual effect on the economy of \$100 million or more, a major increase in consumer costs, or a significant adverse effect on competition. The FAA has determined that this rule is not "major" as defined in the executive order, therefore a full regulatory analysis, that includes the identification and evaluation of cost reducing alternatives to this rule, has not been prepared. A more concise final regulatory evaluation has been prepared, however, which includes consideration of the economic consequences of this regulation. This regulatory evaluation is included in the docket.

Comments

The FAA received no comments directly discussing its regulatory evaluation. However, five commentors argue that the proposed change to Appendix C (Airframe Curriculum Subjects), to teach repair of constant speed drive and integrated speed drive generators at level 3 (highest level), would impose too high a cost on AMTS. This amendment would require schools to purchase at least one operating model of each type of generator. The initial Regulatory Evaluation did not consider this cost. However, the FAA agrees with the commentors. The final rule does not include this proposed change, thus eliminating this cost.

Cost Impacts

The NPRM estimated a cost to AMTS related to the purchase of new equipment of \$6,300 for about 30 schools under § 147.17. The FAA now estimates that all AMTS have the equipment to fulfill the new requirements under this section. This rule will add a cost burden to AMTS because of changes in Appendixes B and D. Amendments to Appendix B will require a higher teaching level in some fundamental general subjects, such as mathematics and physics. It lowers teaching levels in some obsolescent subjects, and it requires additional knowledge and skill levels on advanced subjects. The requirement includes teaching electronic repair of solid-state electronic equipment. The FAA estimates that 49, about one-fourth of the 196 certified AMTS, need to purchase new electronic equipment at an average cost of \$5,270 per school. This results in a total cost of approximately \$258,000.

In Appendix D, the rule changes related to powerplant service and repair will require about one-sixth of AMTS to buy and mount a turbine engine; and it will cause about one-sixth of the schools to mount the turbine it owns. A fully mounted turbine engine costs about \$74,000; setting up a turbine

a more efficient use of instructors because the rule will not require schools to predesignate which class a particular instructor must teach. This change is estimated to save the industry \$1.1 million over the decade.

Changes to § 147.15 allow schools to use their existing classroom and laboratory areas more efficiently. While not affecting existing facilities, new applicants will need less space due to this amendment. Over the next 10 years, this should save new applicants a total of \$1.3 million.

The amendment to § 147.21 permits schools to use a standard 50-minute instruction unit. This convention conforms with class time practice used at most educational institutions. Also, this section allows AMTS to teach material at a level equal to or higher than that designated in Appendix A of Part 147. Over the decade this savings amounts to \$7.5 million for the industry by reducing administrative time requirements.

Amendments to §§ 147.23 and 147.36 permit schools to expand the use of instructors not certified as a mechanic to teach additional material in the general curriculum. This change will allow schools to use specialized personnel to teach math, physics, basic electricity, and similar subjects. The FAA determined that each school could replace one full-time-equivalent certificated mechanic instructor with an instructor not certified as a mechanic. With difference in annual salary of \$7,400 between the two, the rule should save schools \$16.8 million over the decade.

The amendment to § 147.31 gives AMTS more flexibility in crediting and testing, thus relieving some administrative burden. The rule permits schools to administer tests after a student completes a unit of instruction and give credit for the general curriculum courses previously taken at that school. Much of the amendment codifies existing practices. However, the greater flexibility reduces instructor time. The FAA estimates that two days a month of an instructor's time can be saved. This amendment will save AMTS \$12.0 million over the decade.

Amendments to Appendix B increase student exposure to fundamental concepts and new, up-to-date skill requirements of the aviation industry. They also delete certain obsolete requirements. By deleting outdated requirements, this amendment saves new AMTS from the purchase of \$2,600 in heat treatment equipment no longer required. Over the decade, this saves the AMTS about \$184,000.

Changes to Appendix D increase the technical knowledge and skill requirements for the powerplant curriculum. The amendment eliminates the need of new schools to purchase radial engines which cost about \$1,050 apiece. These amendments will save the AMTS about \$74,000 over the decade.

Cost-Benefit Comparison

The cost decrease resulting from this rule will total \$39 million over the decade. (This is equal to \$23 million when discounted to 1990.) The largest savings come from the relaxation of the constraint to use certified mechanics for certain classes. This saves the industry \$17 million over the next decade. In contrast, new requirements set down by this rule will cost the industry, public, and the FAA about \$3 million over the next decade. The largest cost increase will come from the amendments to Appendix D related to powerplant service and repair. To meet the rule requirements, a third of the schools will need to purchase or mount a turbine at a cost of more than \$2.5 million. The following table outlines all of the rules costs and benefits.

Table 1—Summary of Cost Increase and Decreases

Part 147 Revision Rule—Aviation Maintenance Technician Schools

Section	What the amendment will do	Cost Assumptions	Net savings
§ 147.5	Amendment eliminates requirement that certified teachers be listed as qualified for a given subject matter before teaching it. Requires AMT schools give the FAA only a list of FAA certificated instructors.	Save 16 hours annually for each school and one hour per school for the FAA.	\$1.1 million

§ 147.15 ...	Eliminates requirement to overhaul engines to an airworthy condition for mechanics training. This will save new schools the expense of building or leasing building or leasing engine overhaul space.	Assumes 600 sq ft room; \$30 per sq ft; 7 new schools per year.	\$1.3 million
§ 147.17 ...	Updates school aircraft requirements for navigation and communications equipment. FAA now estimates that all existing schools have the appropriate equipment to meet the requirements.	No cost impact.	\$0.0
§ 147.19 ...	Eliminates the reference to tools and requires the AMT schools to supply only special tools. Results in students purchasing standards tools at new schools.	No cost change to society since cost only shifts from schools to students.	\$0.0
§ 147.21 ...	Permits schools to use a standard 50-minute instruction unit. Also allows AMT schools to teach material at a level higher than designated.	Save administrative time.	\$7.5 million
§ 147.23 & § 147.36.	Requirement will permit schools to expand the use of instructors who are not certificated mechanics to teach additional material in the general curriculum. Specialty teachers in math, physics, etc. can be employed.	Cost difference between certificated and noncertificated teacher estimated at \$7,000/yr. Savings for 196 accrue to schools.	\$16.8 million
§ 147.31 ...	Amendment will give testing flexibility to AMT schools.	Cost savings based on a 2 days per month less for one instructor's time at each of 196 schools.	\$12.0 million
§ 147.35 ...	Amendment will alter wording so that the AMT schools need give students a transcript of grades only upon request.	Reduces cost but in an insignificant way.	\$0.0
§ 147.38 ...	Amendment gives AMT schools flexibility to teach subjects above the teaching levels required.	No economic impact.	\$0.0
Appendix A.	Amendment facilitates use of new teaching materials and equipment such as computers and teaching software.	Possible long term savings that are indeterminable.	\$0.0
Appendix B.	Amendment will increase student exposure to fundamental concepts and updates skill requirements.	Cost of new equipment to existing schools is \$5,300. New schools can save \$2,600 on old equipment not required.	(\$65,000)

Appendix C.	Amendment will add a subject area on composite aircraft structural inspection, testing, and repair as well as delete and reduce certain outdated material in subject areas such as wood and fabric. It will increase certain current and emerging areas of technology.	Changes will have little cost impact since no capital expenditures are needed.	\$0.0
Appendix D.	Amendment will add new subject material requirements for powerplant curriculum. It also will require all certificated AMT schools to use an operating jet turbine engine for instructional purposes.	One-sixth need to buy turbine (\$74,000) and one-sixth need to have a turbine mounted (\$2,600).	(\$2.4 million)

In addition to a large net savings from this rule, the FAA believes that the amendment has certain nonquantifiable benefits. In particular, the amendments to § 147 will result in better trained aviation mechanics and the skills of AMTS graduates will better fit the needs of the airline industry.

The FAA has determine that this rule will give the industry a substantial cost reduction. Also, the AMTS will produce better trained mechanics with these changes.

Regulatory Flexibility Determination

The Regulatory Flexibility Act §§ 603(b) and 603(c) of 1980 (RFA) ensures that government regulations do not needlessly and disproportionately burden small businesses. The RFA requires FAA to review each rule that may have "a significant economic impact on a substantial number of small entities."

FAA criteria sets a "substantial number" as not less than 11 and more than one-third of the small entities subject to the amendment. This rule will affect 162 aviation maintenance technician schools. The threshold size for an AMTS is 150 employees. A significant economic impact for an AMTS is \$28,350.

This rule will have significant economic impact on approximately one-sixth of the AMTS. This impact will come from the requirement to purchase a turbine engine at a cost of about \$74,000. However, only one-sixth of the industry will experience this significant cost, well below the one-third required to meet the guidelines for a significant impact. The remaining schools will receive a cost savings of about \$16,000 a year. This cost savings is below the \$28,350 threshold. The FAA, therefore, has determined that this rule will not have a substantial economic impact on a significant number of small entities.

International Trade Impact Assessment

This rulemaking will have little long-term impact on trade opportunities for both American firms doing business overseas and for foreign firms doing business in the United States. All AMTS regulated by Part 147 are in the United States. The AMTS do attract foreign students for study since the United States leads the world in aviation technology.

Federalism Implications

The regulations herein would not have substantial direct implications on the states, on the relationships between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that these regulations would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Regulatory Evaluation and the International Trade Impact Analysis, the FAA has determined that this final rule is not major

The Rule

In consideration of the foregoing, the Federal Aviation Administration amends 14 CFR Part 147 of the Federal Aviation Regulations effective September 28, 1992.

The authority citation for Part 147 continues to read as follows:

Authority: 49 U.S.C. 1354(a), 1355, 1421, and 1427; 49 U.S.C. 106(g).

Amendment 147-6

Primary Category

Adopted: September 1, 1992

Effective: December 31, 1992

(57 FR 41360, September 9, 1992)

SUMMARY: This final rule establishes a new primary category of aircraft, and new simplified procedures for type, production, and airworthiness certification, and associated maintenance procedures. Aircraft in this category are of simple design intended exclusively for pleasure and personal use. Primary category aircraft (airplanes, gliders, rotorcraft, manned free balloons, etc.) may be unpowered or powered by a single, naturally aspirated engine, with a 61-knot or less stall speed limitation for airplanes and a 6-pound per square foot main rotor disc loading limitation for rotorcraft. Primary category aircraft may have a maximum certificated weight of no more than 2,700 pounds, a maximum seating capacity of four, and unpressurized cabins. Although these aircraft may be available for rental and flight instruction under certain conditions, the carrying of persons or property for hire is prohibited. This final rule also adds a new section addressing the falsification of documents submitted as part of certification for products and parts.

EFFECTIVE DATE: December 31, 1992.

FOR FURTHER INFORMATION CONTACT: Mr. Manuel Macedo, Aircraft Engineering Division (AIR-110), Aircraft Certification Service, Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591, telephone (202) 267-9566.

SUPPLEMENTARY INFORMATION:

Availability of Final Rule

Any person may obtain a copy of this final rule by submitting a request to the Federal Aviation Administration, Office of Public Affairs (APA-200), 800 Independence Avenue SW., Washington, DC 20591, or by calling the Office of Public Affairs at (202) 267-3484. Communications must identify the docket number of this amendment.

Persons interested in being placed on a mailing list for future notices should request a copy of Advisory Circular 11-2A, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

On March 7, 1989, the Federal Aviation Administration (FAA) published Notice of Proposed Rulemaking (NPRM) Notice No. 89-7 (54 FR 9738), which proposed the adoption of a new category of aircraft to be known as "primary category." Such aircraft would be of simple design and intended exclusively for pleasure and personal use. These aircraft (airplanes, gliders, rotorcraft, manned free balloons, etc.) would be unpowered or powered by a single, naturally aspirated engine having a certificated takeoff rating of 200 horsepower or less, would have a maximum weight of 2,500 pounds or less, and would

a Supplemental Notice of Proposed Rulemaking (SNPRM) (56 FR 36972) that indicated that helicopters in the primary category would also be subject to part 36 requirements.

On August 1, 1991, the FAA also published Notice No. 89-7A (56 FR 36976) which reopened the comment period on the NPRM. The reopening was based on a February 1990 meeting between representatives of the Experimental Aircraft Association (EAA), the Aircraft Owners and Pilots Association (AOPA), and the FAA. The EAA and AOPA requested an opportunity to discuss and revise their original comments concerning primary category aircraft maintenance, the parameters used to define primary category aircraft, and the rental and use of those aircraft for pilot training. During the meeting, the EAA stated that there had been significant developments in the general aviation industry since the date of its original petition in 1984. Specifically, the EAA pointed out that many small aircraft manufacturers had gone out of business, and that kit manufacturers would not want to begin large-scale production of primary category aircraft if the rules were adopted as proposed. Because of the higher cost of preassembled kit aircraft, the EAA indicated that kit manufacturers believe that the major domestic market would consist of fixed-base operators (FBO's) and flying clubs, not individuals.

The EAA also stated that kit manufacturers export 36.5 of their total kit production and believe this percentage would be the same for preassembled kit aircraft. However, the EAA was concerned that other civil airworthiness authorities might not accept preassembled kit aircraft into their respective countries because the aircraft would not meet International Civil Aviation Organization Annex 8 requirements which, the EAA believes, compel the exporting State's certification authority to set aircraft airworthiness standards, and no airworthiness standard was envisioned for primary category aircraft. Consequently, the EAA wished to submit additional comments based on its re-evaluation of the proposed rules. A summary of this meeting has been placed in Docket No. 23345. Following the meeting, the FAA received additional written comments from the EAA, which have also been placed in the docket.

Since the EAA was afforded the opportunity to revise its original proposal, the FAA determined that it was necessary to reopen the comment period for Notice No. 89-7 to afford interested persons the opportunity to comment on those issues addressed by the EAA.

The EAA recommends changing the criteria for primary category aircraft from a maximum weight of 2,500 pounds and a single, naturally aspirated engine with a takeoff rating of 200 shaft horsepower or less, to a maximum weight of 2,700 pounds and a single, naturally aspirated engine, with a stall speed of 61 knots or less for airplanes, and a 6-pound per square foot main disc loading limitation for rotorcraft. According to the EAA, the increased weight would permit manufacturers to produce a four-place aircraft with sufficient performance to operate in high-density altitude conditions. The EAA recommends a stall speed limit instead of an engine horsepower limit because stall speed would better define airplane performance and the airplane's landing speed in the event of a power failure. The EAA believes that, for the last 50 years, the 61-knot stall speed limitation in part 23 has established acceptable levels of single-engine airplane performance for safe operation by general aviation pilots. The EAA also states that a 6-pound per square foot disc loading limitation more accurately describes rotorcraft performance but did not provide any rationale for this belief.

The EAA also urges that the proposed rule be revised to permit the rental of primary category aircraft for pilot training and personal use, noting that the number of normal, utility and acrobatic category training aircraft available has decreased dramatically since the time of its original petition. The EAA asserts that rental for personal use would open a substantial market with FBO's. The EAA continues to support the concept of pilot-owners performing certain maintenance and inspection functions on their own aircraft after appropriate training. The EAA views the conversion of aircraft from the normal, utility and acrobatic categories to the primary category as a means to extend this maintenance privilege. This conversion would be made through the already existing supplemental type certificate (STC) process. For example, an individual owner or a type certificate holder of an aircraft originally type certificated under FAR part 23 or CAR 3 would submit an application for a STC to convert a specific aircraft or a number of specifically identified aircraft to primary category. As part of the application, the applicant would also submit its proposed special inspection and maintenance program that specifically identifies the inspection and preventive maintenance tasks that may be performed by a pilot owner. The EAA recommends that those primary category aircraft used for rental or pilot training be maintained only by certificated mechanics or repair stations. However, the EAA states that these aircraft maintenance

owners in the aviation community receive notification of rulemaking actions through aviation magazines. The EAA stated that it intended to publish the NPRM in its publication *Sport Aviation*, and believed that other aviation magazines would also publish information on the NPRM.

Discussion of Comments

The FAA received 369 comments in response to the original NPRM and 773 comments in response to the reopening of the comment period and the SNPRM regarding noise. The comments were evaluated to determine the nature of the commenters (individuals, flying clubs, FBO's, manufacturers) and their major concerns. The number of comments received breaks down as follows: Individuals—548 comments; Pilots—447 comments; Manufacturers—29 comments; Associations—32 comments; Businesses—50 comments; State and local government—6 comments; and Other—23 comments. The following is a discussion of comments by issue.

Pilot-owner Maintenance

In the original NPRM, the FAA proposed to allow properly qualified pilot-owners to perform inspection and maintenance tasks prescribed and specifically identified as preventive maintenance. To be properly qualified, a pilot-owner would have to successfully complete an FAA-approved course given by an FAA approved aviation maintenance technician school, or by the holder of the production certificate for the pilot-owner's aircraft.

This proposal generated 246 responses of which 184 favored the proposal. The commenters generally agreed that safety will actually increase since owner-pilots would be encouraged to perform maintenance as soon as the need arises rather than wait until an annual inspection and/or the availability of a certified mechanic. By being allowed to perform maintenance, the FAA anticipates that pilot-owners will also become more familiar with the maintenance needs of their aircraft and thus maintain them more diligently.

Almost all of the 62 responses that oppose the proposal were from individuals who are in maintenance-related occupations or who are members of maintenance-related associations.

The FAA is not persuaded by comments that suggest that the level of safety will decrease as a result of pilot-owner maintenance. Any pilot-owners who aspire to perform additional maintenance tasks on their primary category aircraft must be licensed as private pilots. Each must also be issued a certificate of competency upon completion of an approved inspection and maintenance course. Such courses may be offered by a certificated school, by the holder of the production certificate for the individual aircraft, or by another entity that has a course approved by the Administrator. These special inspection and maintenance courses must be specific to the make and model of the owner's aircraft. With these conditions, the FAA expects that pilot-owner maintenance on these primary category aircraft will not result in decreased safety. Accordingly, pilot-owner maintenance provisions are included in the final rule.

The availability of an optional maintenance program in this rule does not in any way exempt primary category aircraft from the maintenance provisions of Part 43. The FAA does not anticipate approving any special inspection and maintenance program that allows pilot-owners to do their own annual inspections, work on engines, or accomplish any inspection or repair required by an airworthiness directive. Further, all special inspection and maintenance programs will be subject to the recordkeeping requirements that exist for other aircraft under the regulations.

If a pilot-owner operates a primary category aircraft that has had an inspection or maintenance task that is part of its special program performed improperly, certificate action may be taken against that pilot-owner.

Weight Limit

The weight limit of 2,500 pounds proposed in the original NPRM generated 55 comments. Four commenters oppose the concept, suggesting that the horsepower and occupancy restrictions in the proposal would serve to effectively keep the weight within reason. The majority of commenters suggest increasing the weight limit, and offer a variety of suggestions ranging up to 4,000 pounds.

The weight limit of 2,700 pounds proposed in the reopening of the comment period generated 165 comments of which 134 favor the increase. AOPA states that the revised weight limit more accurately reflects the type of aircraft that will be designated as primary category. The EAA states that the increased

A few commenters, including the Sport Aircraft Manufacturers Association, suggested adopting the Canadian microlight weight limit of 3,200 pounds. The Professional Aircraft Maintenance Association (PAMA) opposes the increase, suggesting that it would encompass complex aircraft never intended to be included in the primary category. The PAMA also suggests that the increase would allow greater conversion from the normal, utility and acrobatic categories, thus allowing many older aircraft to avoid annual inspections. The Joint Aviation Authorities (JAA) opposes the 2,700 pound weight limit, suggesting that it would undermine attempts to develop a common code of aircraft certification regulations, resulting in primary category aircraft facing European import restrictions.

In response to the proposed 6-pound per square foot main disc loading limitation for rotorcraft, one commenter states that this is twice the average disc loading limitation of a training helicopter. A 4-pound per square foot main disc loading limitation was offered as an alternative. Another commenter states that the 6-pound per square foot limit is unsafe and unrealistic but gave no rationale for this claim. The FAA disagrees. The FAA is aware of at least one rotorcraft model that is compatible with the proposed primary category rule. It is of simple design, weighs less than 2,700 pounds and has a main disc loading of slightly over 5 pounds per square foot.

The FAA agrees that the proposed weight limit of 2,700 pounds best describes the type of aircraft that the FAA envisions as primary category. The weight of an aircraft is not necessarily indicative of its complexity. The 2,700 pound limit allows sufficient design latitude to accommodate new technology, safety features, and the conversion of a greater number of aircraft from the normal, utility and acrobatic categories.

The FAA does not agree that the 2,700 pound weight limit will undermine efforts toward the harmonization of aircraft certification regulations. As discussed below in the section on the development of certification standards, primary category was developed to provide a stimulus to small aircraft manufacturers in the United States, not to facilitate exportable products. Nor are new aircraft designed and certificated as primary category barred from export; a person wishing to export one must simply obtain the approval of the importing country. Accordingly, the final rule adopts the 2,700 pound weight limit.

Horsepower/Stall Speed Limitations

The 200-horsepower engine limitation proposed in the original NPRM generated 28 comments. Five commenters favor the 200-horsepower limitation and 23 offer alternatives, ranging from 210–350 horsepower. Five of these alternatives suggest a weight-to-horsepower ratio as more appropriate in defining a primary category aircraft. The EAA proposed to replace the 200-horsepower limitation with a 61-knot or less stall speed limitation. This suggestion generated 165 comments of which 150 favor the concept. Those in favor indicate that a stall speed limitation provides a superior indication of an aircraft's handling predictability and performance, whereas a horsepower limitation dictates only cruising speed. A low stall speed, they urge, would enhance safety because most accidents occur during landing and take-off.

Six commenters oppose the use of a stall speed limitation. Of these, two believe that 61 knots is too high, two suggest there should be no stall speed if the pilot can demonstrate proficiency, and two do not give any reason for their opposition.

Nine commenters offer some alternative to the proposal. Of these, seven propose stall speeds varying from 45 to 55 knots and two believe that the 61-knot stall speed limitation should accompany rather than replace the 200-horsepower limitation.

The FAA agrees that a 61-knot or less stall speed limitation is appropriate and that it will encourage the production of safe primary category aircraft. The FAA is persuaded that the 50-year track record of the 61-knot stall speed limitation in Part 23 has established it as an acceptable level of single-engine airplane performance for safe operation by general aviation pilots. Accordingly, the final rule adopts the 61-knot or less stall speed limitation.

Rental and Flight Instruction

The original NPRM stated that primary category aircraft were not intended for compensation, hire, or flight instruction. Eight comments were received on this issue, suggesting that the proposal be revised to allow primary category aircraft rental and flight instruction. The notice reopening the comment period

aircraft will be FBO's and flight schools. Only after the aircraft have depreciated will private parties be able to afford them. Therefore, if the largest anticipated market is unable to use these aircraft, manufacturers will not produce them.

Three helicopter associations oppose the rental of primary category aircraft. They state that rental of primary category helicopters will have an adverse impact on the rental revenue of operators of existing normal and transport category helicopters. Four commenters offer alternatives that permit rental and pilot training. One recommends allowing flight training in primary category aircraft but only for the pilot-owner's immediate family. One recommends that rental be expanded to include transportation of cargo and passengers. One recommends that rental be allowed for crop dusting. One recommends that primary category be expanded to include complex single-engine designs suitable for training commercial and certified flight instructor applicants.

The FAA agrees that it is reasonable to allow the rental of primary category aircraft, provided that these aircraft are maintained by an FAA-certificated mechanic or repair station. This maintenance requirement is necessary to ensure the most consistent performance of maintenance for aircraft used by non-owner pilots. The FAA does not agree that usage should be expanded to include use for compensation or hire, such as the transport of goods or passengers. The primary category was intended to create a new class of personal and recreational use aircraft, not an additional vehicle for commercial purposes. Thus, the rule allows rental of primary category aircraft for the personal use of the pilot, but would not extend this use to that pilot's taking on paying passengers, hauling freight, or any other compensated activity.

Subject to the operating limitations of § 91.325 and § 91.409(b), primary category aircraft may be used for flight instruction. Pilot certification in these aircraft is limited to aircraft that otherwise meet the requirements of FAR § 61.45.

Primary Category—Light

The original NPRM proposed "Primary category—light" as a sub-category of aircraft. This proposal generated considerable opposition from the ultralight community, as well as some confusion. Of the 148 comments received on this issue, 106 opposed the proposed new designation.

The NPRM did not identify clearly that primary category-light was proposed as an option for ultralights of expanded design. It would have offered optional certification for certain ultralights to become certificated and issued special airworthiness certificates as primary category aircraft, provided that they weighed no more than 1,000 pounds. Currently these expanded-design ultralights must receive either special or standard airworthiness certificates since they exceed the weight criteria to be considered an ultralight vehicle under Part 103. In general, the commenters suggest that the proposed classification would separate the two-seat ultralight trainers from the rest of ultralight aircraft, forcing aspiring ultralight pilots to obtain flight training in heavier, conventional aircraft. This would cause problems, many believe, because ultralight student pilots would be unaccustomed to the handling qualities of an ultralight. Approximately 90 ultralight advocates suggest revising Part 103 as an alternative to the primary category-light classification. One ultralight manufacturer makes a similar suggestion, recommending that Part 103 be revised to accommodate a two-seat ultralight trainer. The commenter also notes that several foreign countries are operating mandatory ultralight programs in airworthiness, pilot and instructor ratings, and aircraft registration.

The FAA agrees that the primary category-light classification is inappropriate, and it is not included in the final rule. Comments concerning amendments to Part 103 are beyond the scope of this rulemaking, since no amendments to Part 103 were proposed.

Impact on Manufacturers

The FAA requested comments on the EAA/AOPA claim that a primary category aircraft would be less costly to manufacture, thereby allowing manufacturers to fill a demand for low cost aircraft. In response to the original NPRM, 11 commenters responded to this claim. Ten state that it will have a positive impact, but submitted no support for their statements. One manufacturer states that the creation of a primary category will not offer any substantial benefits to manufacturers unless savings reach 35 percent compared to existing certification costs. The commenter claims that anything less would offer

new technology. The FAA agrees with the original petitioners that this rule will stimulate aircraft manufacturing and benefit the general aviation industry overall.

The final rule permits kit aircraft supplied by the holder of a production certificate to be assembled by another person under the supervision and quality control of the production certificate holder. Under these circumstances, the production certificate holder retains its responsibilities under FAR § 21.165; these responsibilities cannot be delegated to the person assembling the aircraft. Enforcement may be taken against the production certificate holder for any noncompliance with its approved quality control procedures discovered by the FAA at the assembly location. Further, the reporting requirements of § 21.3 remain the responsibility of the type certificate holder.

Alternatively, if a kit aircraft supplied by the holder of a production certificate is assembled by another person who is not under the supervision and quality control of the production certificate holder, the completed aircraft is eligible only for an experimental airworthiness certificate.

Pilot-Owner Cost Reduction

The FAA requested comments on whether primary category aircraft would be less costly to own and operate as a result of the pilot-owner's ability to perform certain maintenance tasks. Forty comments were received in response to the original NPRM, and 78 in response to the reopening of the comment period. All but two indicate a belief that aircraft in the new primary category would benefit from reduced operational costs. Almost all of the commenters suggest that the reduced costs that result from the ability to perform additional maintenance would allow owner-pilots to afford additional flight time, which would benefit the industry as a whole. However, the PAMA states that any savings would be nominal and not worth the trade-off in safety that would result from increased pilot-owner maintenance, although PAMA did not submit any analysis to support its claim.

The FAA does not agree that increased pilot-owner maintenance tasks will result in reduced safety. All pilot-owners who aspire to perform additional maintenance tasks on their primary category aircraft must hold a private pilot's certificate and be issued a certificate of competency upon completion of an approved special inspection and maintenance course offered by a certificated school, by the holder of the production certificate for the specific aircraft, or by another entity that has a course approved by the Administrator. The FAA anticipates that this feature of the rule will encourage regular maintenance and provide pilot-owners an economic incentive to become more familiar with their aircraft.

Growth in Personal-use Aircraft

The FAA requested comments on the petitioners' claim that primary category aircraft would stimulate the introduction of new, less costly, personal-use aircraft. All 99 commenters responding to the original NPRM and the reopening state that the proposal would have a positive impact on the number of personal-use aircraft, indicating that there is an untapped market for kit aircraft in completed form. Twenty-two of the commenters note that the need to replace aging training aircraft will ensure the demand, while the proposed rule offers sufficient incentive to ensure the supply.

Limited Checkouts

The reopening of the comment period included a proposal by the EAA to allow the use of primary category aircraft that are maintained by the pilot-owner to be used for limited checkouts. A limited checkout is an opportunity for a pilot to become familiar with the aircraft flight manual, receive a briefing on the aircraft characteristics from the pilot-owner, and conduct a short local flight that includes at least three takeoffs and landings. Of the 91 responses to this issue, 89 favor allowing limited checkouts. Only nine commenters offer any rationale for their support of limited checkouts in pilot-owner maintained primary category aircraft, stating that they are necessary to the eventual commercial resale of these aircraft.

The FAA agrees. Pilot-owners authorized to perform additional maintenance tasks who wish to allow a prospective buyer to examine the aircraft, or wish to receive flight instruction in their own aircraft are not required to have their aircraft maintained by an FAA-certificated mechanic or repair station. Without this allowance, the pilot-owners would be forced to use FAA-certificated mechanics or repair stations to maintain their aircraft in order to eventually offer it for sale and allow a prospective purchaser to fly it, or the pilot-owners would be forced to rent an aircraft in order to receive flight instruction. Accordingly, § 91.325 permits a person other than the pilot-owner to operate a primary category aircraft

which prohibits paid flight instruction from being given in an aircraft provided by the instructor unless that aircraft has been inspected as described in § 91.409(b).

Development of Certification Standards

The original NPRM proposed that private industry be allowed to develop certification design standards through associations and consensus groups, and submit those standards to the FAA for approval. The original NPRM generated 36 comments on this issue, while 46 were received in response to the reopening. Approximately 75 of the commenters favor using the private sector to develop and streamline certification standards. Only 7 commenters oppose the concept. Commenters recommend that FAR Part 23, Civil Aviation Regulations (CAR) Part 3, and the Civil Aeronautics Manuals (CAM) 3 and 18 are viable bases from which primary category aircraft certification standards could be established. Eleven commenters suggest that reliance on the private sector would be the best way to develop standards for approving design and materials use. The Australian Civil Aviation Authority suggests Part 23 Appendix B as an appropriate resource from which to develop suitable simplified control surface loadings.

Nineteen commenters suggest streamlining the current certification process rather than creating a new one. The benefits of this streamlined certification process would include a stimulation of light aircraft production, the development of new technology, and the introduction of training aircraft of new design.

One manufacturer states that Part 23 certification standards are neither difficult nor costly, and suggests revising Part 23, Appendix A instead of allowing industry to submit new standards. The commenter states that small manufacturers will not benefit from the creation of a primary category because the lack of certification standards will inhibit the international marketability of the products.

The FAA agrees that the development of certification standards by the private sector represents the most productive and cost-effective manner of streamlining the certification process. The development of airworthiness design criteria by the private sector would be similar to the FAA's Technical Standards Order (TSO) authorization program. The FAA's TSO program has been highly successful in promoting design, production, and quality control of many articles which are critical to aircraft safety. The FAA's TSO approval process enables the public to benefit from the collective technical knowledge of the private sector. This is discussed in more detail in the following section on type certification.

The FAA does not agree that the creation of a primary category will not benefit small manufacturers. The rule is intended to provide an economic stimulus to the U.S. small aircraft industry by reducing certification and manufacturing costs. Moreover, although the rule was not designed to facilitate the development of aviation products for export, primary category aircraft may be eligible for export certificates of airworthiness issued under Part 21, Subpart L.

Comments received on this issue reflect a misunderstanding of the requirements for the export and import of aeronautical products. Under the provisions of the Chicago Convention, a signatory country may permit aircraft from other countries to operate in its airspace. To do so, an aircraft must have an airworthiness certificate issued by the country of registration, based on a detailed and comprehensive airworthiness code as described in ICAO Annex 8 to the Chicago Convention. An aircraft that does not meet Annex 8 Standards may nonetheless be permitted to fly in an ICAO country, but only with the prior permission of the cognizant airworthiness authority. Thus, owners of U.S.-registered primary category aircraft seeking to operate outside of the United States would require prior permission of the appropriate airworthiness authority.

Annex 8 represents an operating limitation entirely separate from the ability to export or import a product. Under § 21.329, export certificates of airworthiness may be issued only for aircraft eligible for a standard airworthiness or restricted airworthiness certificate unless the importing country indicates that an aircraft with a special airworthiness certificate is acceptable. Thus, an applicant can obtain an export certificate of airworthiness for a primary category aircraft if it presents the evidence required under § 21.327(e)(4) that the importing country's airworthiness authority has agreed. The export certificate of airworthiness would include a notation that the product does not meet Annex 8 standards.

of primary category aircraft be revised to exclude complex systems such as constant speed propellers, retractable landing gear, and hydraulic systems.

The FAA disagrees with the limitations suggested by some commenters because those limits would exclude many present simple aircraft types that have excellent safety records from converting to primary category. These lower limits would also preclude a number of kit aircraft currently being manufactured and certificated in the experimental category from obtaining a primary category type certificate, production certificate, and a special airworthiness certificate. The FAA finds no safety-related reason to restrict primary category eligibility to less than that contained in the revised proposal. The EAA suggests that the conversion of aircraft originally type certificated under FAR Part 23 or CAR 3 to the primary category could be accomplished using the STC process. The FAA agrees with this method as an acceptable means of conversion. When making an STC application for conversion, the applicant must submit the special inspection and maintenance program which specifically identifies the inspection and preventive maintenance tasks that may be performed by the pilot-owner, as provided in new § 21.184(c).

The simplified type certification process envisioned for primary category aircraft is expected to draw heavily from airworthiness standards already in the regulations, existing delegation procedures, and statements of compliance made by applicants for type certification. Applicable airworthiness standards may be approved using a procedure similar to the FAA's Technical Standards Order authorization program, which is used currently to approve the design and production quality control of aviation products that are critical to safety and that are installed on normal category aircraft.

To complete its type certification program, an applicant must submit a compliance checklist addressing all applicable airworthiness standards. This checklist must contain a summary of the methods used to determine compliance with the airworthiness standards previously approved, and must reference all reports or records of engineering analysis and test data used to establish compliance. This checklist must be retained by the applicant as a permanent part of its certification file. These simplified procedures will result in less FAA involvement as compared to current aircraft certification procedures. While the ultimate responsibility to make findings regarding the issuance of type certificates remains with the FAA, the agency anticipates remaining selectively involved in the administration of individual type certification applications.

Primary Category Aircraft Operating Limitations

The original NPRM proposed three basic operating limitations: (1) primary category aircraft could not be used for carrying persons or property for hire or compensation; (2) primary category-light aircraft could not be used in any controlled area; and (3) primary category-light aircraft could only be operated using visual flight rules (VFR). The notice reopening the comment period included an EAA-requested change that would allow the use of primary category aircraft for training and for rental if the aircraft is maintained by an FAA-certificated mechanic or repair station. Thirty-five comments were submitted in response to the original NPRM, while the reopening generated four comments on this issue. Four commenters suggest that the proposed prohibition against carrying persons or property for compensation or hire is unreasonable for those primary category aircraft certificated to a level of safety equivalent to aircraft having standard airworthiness certificates.

The FAA disagrees. As discussed previously, primary category is an effort to develop a simplified certification process to stimulate the production and use of simpler personal-use and recreational aircraft. The process was never intended to create another form of commercial aircraft. The FAA considers the current choice of aircraft certification categories and standards sufficient for the safe development of commercial aircraft. Since no commercial use was ever intended or proposed, discussions of specific uses for compensation or hire are beyond the scope of this rulemaking.

Also as discussed previously, the FAA agrees that primary category aircraft may be used for rental or flight instruction. Primary category aircraft rental is permitted under § 91.325 if the aircraft is maintained by an FAA-certificated mechanic, and for flight instruction pursuant to the limitations of §§ 91.325 and 91.409(b). This availability for rental and flight instruction is expected to create a demand for privately owned aircraft that is sufficient to stimulate their production.

alternative periods for the periodic inspection, but offer no justifications for the suggested alternatives. Six comments oppose the proposal, stating that safety will decrease by allowing pilot-owners to perform inspection functions and by extending the periodic inspection period. The FAA disagrees with the statements that pilot-owner inspection and maintenance would reduce safety. Pilot-owners will be required to satisfactorily complete an FAA-approved special inspection and preventive maintenance training program, and to obtain a certificate of competency for the particular aircraft involved, before being allowed to perform the specified inspection and maintenance tasks.

The FAA agrees that an increase in the required inspection interval could be detrimental to overall safety. There is significant, successful history supporting the standard 12-month inspection period required for all other certificated aircraft, and little viable rationale was submitted in support of extending it for primary category aircraft. Accordingly, the 12-month annual inspection interval required by FAR § 91.409(a) (or the 100-hour interval required by § 91.409(b)) is applicable to primary category aircraft.

Noise Standards

Five commenters object to the application of Part 36 noise standards to primary category aircraft, suggesting that compliance with Appendix H, in particular, will jeopardize the production of primary category helicopters. As stated previously, the applicability of Part 36, Appendix H noise standards is mandated for all aircraft for which a type certificate is sought on or after March 6, 1986. As discussed in the SNPRM, the FAA is required to determine whether noise abatement is achievable by prescribing standards. The Noise Control Act of 1972 amended the Federal Aviation Act, leaving the FAA no discretion in this matter when issuing a type certificate.

In general, no noise certification under Part 36 is required for a small airplane that was type certificated before the requirements of Part 36 became effective. However, these airplanes must demonstrate compliance with Part 36 if there is an acoustical change made to the airplane, or if there is a change in the type or airworthiness certification, such as a change from a normal to a special type certificate, or from a standard to a restricted airworthiness certificate.

The final rule makes an exception for certain older airplanes that were type certificated before Part 36 existed, that are to be converted to primary category, and that have not undergone an acoustical change. Section 36.501(a)(3) states that an airplane that, (1) was type certificated in the normal, utility or acrobatic category, (2) has a standard airworthiness certificate, (3) has not undergone an acoustical change from its type design, (4) has not previously been certificated under Appendix F or G of Part 36, and (5) that will be converted to primary category need not undergo noise certification under Part 36.

Without this exception, an owner of an older airplane that seeks to gain the other benefits of primary category certification would have to show compliance with Part 36 through a noise certification test because of the simple paperwork conversion to a primary category type certificate. Such tests may be beyond the financial resources of many of the pilot-owners that were meant to benefit by the creation of the primary category and its optional maintenance program features.

This exception will be narrowly construed to include only those older airplanes for which noise certification was not required at the time the original type certificate was issued. Any airplane that has undergone an alteration from its original type design that would cause an acoustical change is not covered by this exception, and must demonstrate compliance with Part 36, Appendix G before a primary category type certificate will be issued. Only airplanes with the noted type and airworthiness certifications are eligible for this exception; other airplanes that change their type certification to primary category must demonstrate compliance with Part 36, Appendix G.

Section 36.805(d)(2) makes this same exception for helicopters that have type or airworthiness certificates that are not subject to compliance with Part 36.

Pilot Certification

The proposed rule did not allow pilot schools to use primary category aircraft for pilot certification. Two manufacturers and one pilot objected to this prohibition, indicating that pilot certification should be allowed.

for pilot certification. However, experience gained in these aircraft may be considered toward a pilot certification requirements.

Falsification of Documents

The NPRM proposed a new § 21.2 addressing the falsification of certificates, approvals, and delegations submitted under Part 21. Section 21.2 is intended to deter fraudulent or intentionally false information from being submitted. The regulation was modeled after similar provisions found in FAR parts 43, 61, 63, 65, and 143 for certificates, authorizations, and ratings issued under those parts.

No comments were received regarding this proposal. Accordingly, § 21.2 is adopted as proposed.

Other Airworthiness Issues

Section 21.184(c) provides for an aircraft with a standard airworthiness certificate to obtain a primary category airworthiness certificate. The FAA cautions, however, that these same aircraft cannot reconvert to a standard airworthiness certificate without a showing that they meet all of the criteria for a standard airworthiness certificate as prescribed by the regulations. Such showings have historically been difficult when an aircraft has remained in a different classification or category for a lengthy period. To facilitate the return to a standard airworthiness certificate, the aircraft records should indicate that the aircraft has been maintained according to the manufacturer's instructions, and that any modifications to the aircraft were either removed or are approved by the FAA, in addition to indicating that all other applicable requirements have been met.

Section 21.184(b) creates a new classification of special airworthiness certificate designated special airworthiness certificate-primary category. Section 21.184(a) allows an applicant to obtain this primary category special airworthiness certificate when the provisions of FAR Part 21 are met for a specific primary category aircraft.

Maintenance Training

The reopening of the comment period on the proposed rule included an amendment to FAR Part 141, Pilot Schools, to include provisions for the instruction of pilot-owners in the maintenance of their primary category airplanes. After further consideration, the FAA has determined that this proposal is inappropriate. The FAA does not consider pilot schools to be the proper forum for instruction in maintenance tasks. The maintenance tasks for primary category aircraft must be tailored for the specific make and model aircraft. In most cases, this would present a curriculum development burden on pilot schools. The FAA considers FAR Part 147, Aviation Maintenance Technician Schools, to be the proper vehicle for such regulations. The amendments to Part 147 containing these provisions are adopted as proposed. In addition, the final rule allows the holder of the production certificate for a primary category aircraft to give instruction in maintenance and to issue certificates of competency in maintenance for that aircraft. Such maintenance programs and instruction must be approved as part of the aircraft's type certificate. The final rule also allows other entities to provide maintenance instruction to pilot-owners provided that the course is approved by the Administrator.

Aircraft Identification

To remain consistent with current regulations and policy concerning the identification of an aircraft with a data plate, the FAA found that kit-built aircraft had to be included in FAR § 21.182(b). No comments were received on this proposal. Accordingly, the final rule incorporates this addition.

Regulatory Evaluation Summary

This section summarizes the full regulatory evaluation prepared by the FAA that provides information on the economic consequences of this regulatory action. This summary and the full evaluation quantify, to the extent practicable, estimates of the costs and benefits to the private sector, consumers, and Federal, State, and local governments.

Executive Order 12291, dated February 17, 1981, directs Federal agencies to promulgate new regulations or to modify existing regulations only if potential benefits to society outweigh potential costs for each regulatory change. The order also requires the preparation of a Regulatory Impact Analysis of all major

the rule has not been prepared. Instead, the agency has prepared a more concise regulatory evaluation that analyzes only this rule without identifying alternatives. In addition to a summary of the regulatory evaluation, this section also contains a regulatory flexibility determination required by the 1980 Regulatory Flexibility Act (5 U.S.C. 601, *et seq.*) and an international trade impact assessment. The complete regulatory evaluation is available for inspection in the docket.

Cost-benefit Analysis

Because of several confounding factors, the FAA is unable to plausibly estimate the number of aircraft that will be certificated under the provisions of this rule and the associated cost differentials. These factors include alternative certification options, manufacturers' legal liability, owner's insurance, resale value of primary category aircraft, and the cost of pilot-owner maintenance training. Nevertheless, the rule can be deemed to be cost-beneficial by virtue of its optional nature and retention of current safety levels. Manufacturers and pilot-owners will elect primary category certification only if it is in their economic interests to do so.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) requires Federal agencies to review rules that may have a "significant economic impact on a substantial number of small entities." The entities that will be affected by this rule are aircraft manufacturers. Based on FAA Order 2100.14A, Regulatory Flexibility Criteria and Guidance, a small aircraft manufacturer is one with fewer than 75 employees; a substantial number is one that is not less than eleven and that is more than one-third of the affected small entities; and the significant economic threshold for aircraft manufacturers is an annualized cost of \$18,200 in 1992 dollars.

Based on the identification and analysis of 17 small manufacturers of conventional categories of aircraft and 110 kit manufacturers of amateur-built airplanes and helicopters, the FAA concludes that this rule could have a significant positive economic impact on a substantial number of small entities. Because of the optional nature of the rule, however, an analysis of alternatives as would otherwise be required by the RFA is unwarranted.

International Trade Impact Assessment

This rule will have little impact on international trade. Both foreign and domestic manufacturers applying for certification in the United States will have the option of using this final rule or an alternative means of certification. Other aviation authorities may not accept primary category aircraft; however, kit manufacturers may continue to sell their unassembled kits abroad.

Federalism Implications

The regulations herein will not have substantial direct effect on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

For the reasons discussed in the preamble, and based on the findings in the Regulatory Flexibility Determination and the International Trade Impact Analysis, the FAA has determined that this final rule is not major under Executive Order 12291. The FAA certifies that this regulation could have a significant positive economic impact on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

The Amendments

Federal Aviation Administration amends 14 CFR Parts 21, 36, 43, 91, and 147 of the Federal Aviation Regulations effective December 31, 1992.

This part prescribes the requirements for issuing aviation maintenance technician school certificates and associated ratings and the general operating rules for the holders of those certificates and ratings.

§ 147.3 Certificate required.

No person may operate as a certificate aviation maintenance technician school without, or in violation of, an aviation maintenance technician school certificate issued under this part.

(Amdt. 147-2, Eff. 5/3/70); (Amdt. 147-3, Eff. 11/26/76)

§ 147.5 Application and issue.

(a) An application for a certificate and rating, or for an additional rating, under this part is made on a form and in a manner prescribed by the Administrator, and submitted with—

- (1) A description of the proposed curriculum;

numbers; and]

(4) A statement of the maximum number of students it expects to teach at any one time.

(b) An applicant who meets the requirements of this part is entitled to an aviation maintenance technician school certificate and associated ratings prescribing such operations specifications and limitations as are necessary if the interests of safety.

[(Amdt. 147-5, Eff. 9/28/92)]

§ 147.7 Duration of certificates.

(a) An aviation maintenance technician school certificate or rating is effective until it is surrendered, suspended, or revoked.

(b) The holder of a certificate that is surrendered, suspended, or revoked, shall return it to the Administrator.

(Amdt. 147-2, Eff. 5/3/70); (Amdt. 147-3, Eff. 11/26/76)

(c) Airframe and powerplant.

§ 147.13 Facilities, equipment, and material requirements.

An applicant for an aviation maintenance technical school certificate and rating, or for an additional rating, must have at least the facilities, equipment, and materials specified in §§ 147.15 to 147.19 that are appropriate to the rating he seeks.

§ 147.15 Space requirements.

An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating must have such of the following properly heated, lighted, and ventilated facilities as are appropriate to the rating he seeks and as the Administrator determines are appropriate for the maximum number of students expected to be taught at any time:

(a) [An enclosed classroom suitable for teaching theory classes.

(b) [Suitable facilities, either central or located in training areas, arranged to assure proper separation from the working space, for parts, tools, materials, and similar articles.

(c) [Suitable area for application of finishing materials, including paint spraying.

(d) [Suitable area equipped with washtank and degreasing equipment with air pressure or other adequate cleaning equipment.

(e) [Suitable facilities for running engines.

(f) [Suitable area with adequate equipment, including benches, tables, and test equipment, to disassemble, service, and inspect—]

(1) Ignition, electrical equipment, and appliances;

(2) Carburetors and fuel systems; and

(3) Hydraulic and vacuum systems for aircraft, aircraft engines, and their appliances.

troubleshooting, and timing engines.]
(Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

§ 147.17 Instructional equipment requirements.

(a) An applicant for a mechanic school certificate and rating, or for an additional rating, must have such of the following instructional equipment as is appropriate to the rating he seeks:

(1) Various kinds of airframe structures, airframe systems and components, powerplants, and powerplant systems and components, powerplants, and powerplant systems and components (including propellers), of a quantity and type suitable to complete the practical projects required by its approved curriculums.

(2) [At least one aircraft of a type currently certificated by FAA for private or commercial operation, with powerplant, propeller, instruments, navigation and communications equipment, landing lights, and other equipment and accessories on which a maintenance technician might be required to work and with which the technician should be familiar.]

(b) The equipment required by paragraph (a) of this section need not be in an airworthy condition. However, if it was damaged, it must have been repaired enough for complete assembly.

(c) Airframes, powerplants, propellers, appliances, and components thereof, on which instruction is to be given, and from which practical working experience is to be gained, must be so diversified as to show the different methods of constructions, assembly, inspection, and operation when installed in an aircraft for use. There must be enough units so that not more than eight students will work on any one unit at a time.

(d) If the aircraft used for instructional purposes does not have retractable landing gear and wing flaps, the school must provide training aids, or operational mock-ups of them.

[(An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating, must have an adequate supply of material, special tools, and such of the shop equipment as are appropriate to the approved curriculum of the school and are used in constructing and maintaining aircraft, to assure that each student will be properly instructed. The special tools and shop equipment must be in satisfactory working condition for the purpose for which they are to be used.)
[(Amdt. 147-5, Eff. 9/28/92)]]

§ 147.21 General curriculum requirements.

(1) An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating, must have an approved curriculum that is designed to qualify his students to perform the duties of a mechanic for a particular rating or ratings.

(b) [The curriculum must offer at least the following number of hours of instruction for the rating shown, and the instruction unit hour shall not be less than 50 minutes in length—]

(1) Airframe—1,150 hours (400 general plus 750 airframe).

(2) Powerplant—1,150 hours (400 general plus 750 powerplant).

(3) Combined airframe and powerplant—1,900 hours (400 general plus 750 airframe and 750 powerplant).

(c) [The curriculum must cover the subjects and items prescribed in Appendixes B, C, or D, as applicable. Each item must be taught to at least the indicated level of proficiency, as defined in Appendix A.]

(3) [A list of the minimum required school tests to be given.]

[(e) Notwithstanding the provisions of paragraphs (a) through (d) of this section and § 147.11, the holder of a certificate issued under subpart B of this part may apply for and receive approval of special courses in the performance of special inspection and preventive maintenance programs for a primary category aircraft type certificated under § 21.24(b) of this chapter. The school may also issue certificates of competency to persons successfully completing such courses provided that all other requirements of this part are met and the certificate of competency specifies the aircraft make and model to which the certificate applies.]

(Amdt. 147-1, Eff. 4/10/67); (Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

§ 147.23 Instructor requirements.

An applicant for an aviation maintenance technician school certificate and rating, or for an additional rating, must provide the number of instructors holding appropriate mechanic certificates and ratings that the Administrator determines necessary to provide adequate instruction and supervision of the students, including at least one such instructor for each 25 students in each shop class. However, the applicant may provide specialized instructors, who are not certificated mechanics, to teach mathematics, physics, basic electricity, basic hydraulics, drawing, and similar subjects. The applicant is required to maintain a list of the names and qualifications of specialized instructors, and upon request, provide a copy of the list to the FAA.
(Amdt. 147-2, Eff. 5/3/70)

more than 6 days or 40 hours in any 7-day period.

(b) [Each school shall give an appropriate test to each student who completes a unit of instruction as shown in that school's approved curriculum.]

(c) A school may not graduate a student unless he has completed all of the appropriate curriculum requirements. However, the school may credit a student with instruction or previous experience as follows:

(1) A school may credit a student with instruction satisfactorily completed at—

- (i) An accredited university, college, junior college;
- (ii) An accredited vocational, technical, trade or high school;
- (iii) A military technical school;
- (iv) [A certificated aviation maintenance technician school.]

(2) A school may determine the amount of credit to be allowed—

- (i) By an entrance test equal to one given to the students who complete a comparable required curriculum subject at the crediting school;
- (ii) By an evaluation of an authenticated transcript from the student's former school; or
- (iii) In the case of an applicant from a military school, only on the basis of an entrance test.

(3) [A school may credit a student with previous aviation maintenance experience comparable to required curriculum subjects. It must determine the amount of credit to be allowed by documents verifying that experience, and by giving the student a test equal to the one given to students who complete the comparable required curriculum subject at the school.]

[(4) A school may credit a student seeking an additional rating with previous satisfactory

(e) [A school shall use an approved system for determining final course grades and for recording student attendance. The system must show hours of absence allowed and show how the missed material will be made available to the student.]

(Amdt. 147-2, Eff. 5/3/70); (Amdt. 147-4, Eff. 6/26/78); [(Amdt. 147-5, Eff. 9/28/92)]

§ 147.33 Records.

(a) Each certificated aviation maintenance technician school shall keep a current record of each student enrolled, showing—

- (1) His attendance, tests, and grades received on the subjects required by this part;
- (2) The instruction credited to him under § 147.31(c), if any; and
- (3) The authenticated transcript of his grades from that school.

It shall retain the record for at least two years after the end of the student's enrollment, and shall make each record available for inspection by the Administrator during that period.

(b) Each school shall keep a current progress chart or individual progress record for each of its students, showing the practical projects or laboratory work completed, or to be completed, by the student in each subject.

(Amdt. 147-2, Eff. 5/3/70)

§ 147.35 Transcripts and graduation certificates.

(a) [Upon request, each certificated aviation maintenance technician school shall provide a transcript of the student's grades to each student who is graduated from that school or who leaves it before being graduated. An official of the school shall authenticate the transcript. The transcript must state the curriculum in which the student was enrolled, whether the student satisfactorily com-

date of graduation and the approved curriculum title.

(Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

§ 147.36 Maintenance of instructor requirements.

Each certificated aviation maintenance technician school shall, after certification or addition of a rating, continue to provide the number of instructors holding appropriate mechanic certificates and ratings that the Administrator determines necessary to provide adequate instruction to the students, including at least one such instructor for each 25 students in each shop class. The school may continue to provide specialized instructors who are not certificated mechanics to teach mathematics, physics, drawing, basic electricity, basic hydraulics, and similar subjects.]

(Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

§ 147.37 Maintenance of facilities, equipment, and material.

(a) Each certificated aviation maintenance technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

(b) A school may not make a substantial change in facilities, equipment, or material that have been approved for a particular curriculum, unless that change is approved in advance.

§ 147.38 Maintenance of curriculum requirements.

(a) [Each certificated aviation maintenance technician school shall adhere to its approved curriculum. With FAA approval, curriculum subjects may be taught at levels exceeding those shown in Appendix A of this part.]

(b) A school may not change its approved curriculum unless the change is approved in advance.

(Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

percentage of those passing the applicable FAA written tests on their first attempt during any period of 24 calendar months is at least the percentage figured as follows

(a) For a school graduating fewer than 51 students during that period—the national passing norm minus the number 20.

(b) For a school graduating at least 51, but fewer than 201, students during that period—the national passing norm minus the number 15.

(c) For a school graduating more than 200 students during that period—the national passing norm minus the number 10.

As used in this section, “national passing norm” is the number representing the percentage of all graduates (of a curriculum for a particular rating) of all certificated aviation maintenance technician schools who apply for a mechanic certificate or additional rating within 60 days after they are graduated and pass the applicable FAA written tests on their first attempt during the period of 24 calendar months described in this section.

(Amdt. 147-2, Eff. 5/3/70); (Amdt. 147-3, Eff. 11/26/76)

§ 147.39 Display of certificate.

Each holder of an aviation maintenance technician school certificate and ratings shall display them at a place in the school that is normally accessible to the public and is not obscured. The certificate must be available for inspection by the Administrator.

§ 147.41 Change of location.

The holder of an aviation maintenance technician school certificate may not make any change in the school's location unless the change is approved in advance. If the holder desires to change the location he shall notify the Administrator, in writing, at least 30 days before the date the change is contemplated. If he changes its location without approval, the certificate is revoked.

§ 147.43 Inspection.

The Administrator may, at any time, inspect an aviation maintenance technician school to determine its compliance with this part. Such an inspection

from time to time.

approved.

§ 147.45 Advertising.

(a) A certificated aviation maintenance technician school may not make any statement relating to itself

and D:

(1) "Inspect" means to examine by sight and touch.

(2) "Check" means to verify proper operation.

(3) "Troubleshoot" means to analyze and identify malfunctions.

(4) "Service" means to perform functions that assure continued operation.

(5) "Repair" means to correct a defective condition. Repair of an airframe or powerplant system includes component replacement and adjustment, but not component repair.

(6) "Overhaul" means to disassemble, inspect, repair as necessary, and check.

(b) *Teaching levels.*

(1) Level 1 requires:

(i) Knowledge of general principles, but no practical application.

(ii) No development of manipulative skill.

(iii) Instruction by lecture, demonstration, and discussion.

discussion, and limited practical application.

(3) Level 3 requires:

(i) Knowledge of general principles, and performance of a high degree of practical application.

(ii) **Development of sufficient manipulative skills to simulate return to service.**

(iii) Instruction by lecture, demonstration, discussion, and a high degree of practical application.

(c) *Teaching materials and equipment.*

The curriculum may be presented utilizing currently accepted educational materials and equipment, including, but not limited to: calculators, computers, and audio-visual equipment.

(Amdt. 147-2, Eff. 5/3/70); **[(Amdt. 147-5, Eff. 9/28/92)]**

- [(2) 1. Calculate and measure capacitance and inductance.]]
- [(2) 2. Calculate and measure electrical power.]]
- (3) 3. Measure voltage, current, resistance, and continuity.
- (3) 4. Determine the relationship of voltage, current, and resistance in electrical circuits.
- [(3) 5. Read and interpret aircraft electrical circuit diagrams, including solid state devices and logic functions.]]
- (3) 6. Inspect and service batteries.

B. AIRCRAFT DRAWINGS

- [(2) 7. Use aircraft drawings, symbols, and system schematics.]]
- (3) 8. Draw sketches of repairs and alterations.
- (3) 9. Use blueprint information.
- (3) 10. Use graphs and charts.

C. WEIGHT AND BALANCE

- (2) 11. Weigh aircraft.
- (3) 12. Perform complete weight-and-balance check and record data.

D. FLUID LINES AND FITTINGS

- (3) 13. Fabricate and install rigid and flexible fluid lines and fittings.

E. MATERIALS AND PROCESSES

- (1) 14. Identify and select appropriate non-destructive testing methods.
- [(2) 15. Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections.]]
- [(1) 16. Perform basic heat-testing processes.]]
- (3) 17. Identify and select aircraft hardware and materials.
- (3) 18. Inspect and check welds.
- (3) 19. Perform precision measurements.

F. GROUND OPERATION AND SERVICING

- [(2) 20. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards.]]
- (2) 21. Identify and select fuels.

- [(3) 24. Extract roots and raise numbers to a given power.]]
- [(3) 25. Determine areas and volumes of various geometrical shapes.]]
- (3) 26. Solve ratio, proportion, and percentage problems.
- (3) 27. Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.

I. MAINTENANCE FORMS AND RECORDS

- [(3) 28. Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.]]
- (3) 29. Complete required maintenance forms, records, and inspection reports.

J. BASIC PHYSICS

- [(2) 30. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight.]]

K. MAINTENANCE PUBLICATIONS

- [(3) 31. Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.]]
- (3) 32. Read technical data.

L. MECHANIC PRIVILEGES AND LIMITATIONS

- (3) 33. Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.

(Amdt. 147-2, Eff. 5/3/70); [(Amdt. 147-5, Eff. 9/28/92)]

listed under each subject heading indicates the level of proficiency at which that item must be taught.

I. Airframes Structures

A. WOOD STRUCTURES

Teaching level

- (1) 1. Service and repair wood structures.
- (**[1]**) 2. Identify wood defects.
- (**[1]**) 3. Inspect wood structures.

B. AIRCRAFT COVERING

- (1) 4. Select and apply fabric and fiberglass covering materials.
- (**[1]**) 5. Inspect, test, and repair fabric and fiberglass.

C. AIRCRAFT FINISHES

- (1) 6. Apply trim, letters, and touch up paint.
- (2) 7. Identify and select aircraft finishing materials.
- (**[2]**) 8. Apply finishing materials.]
- (2) 9. Inspect finishes and identify defects.

D. [SHEET METAL AND NON-METALLIC STRUCTURES]

- (**[2]**) 10. Select, install, and remove special fasteners for metallic, bonded, and composite structures.]
- (2) 11. Inspect bonded structures.
- (**[2]**) 12. Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures.]
- (2) 13. Inspect, check, service, and repair windows, doors, and interior furnishings.
- (3) 14. Inspect and repair sheet-metal structures.
- (3) 15. Install conventional rivets.
- (**[3]**) 16. Form, lay out, and bend sheet metal.]

E. WELDING

- (1) 17. Weld magnesium and titanium.
- (1) 18. Solder stainless steel.
- (1) 19. Fabricate tubular structures.
- (2) 20. Solder, braze, gas-weld, and arc-weld steel.
- (**[1]**) 21. Weld aluminum and stainless steel.

- (3) 26. [Balance, rig, and inspect movable primary and secondary flight control surfaces.]
- (3) 27. Jack aircraft.

G. AIRFRAME INSPECTION

- (3) 28. Perform airframe conformity and air-worthiness inspections.

II. Airframe Systems and Components

A. AIRCRAFT LANDING GEAR SYSTEMS

- (3) 29. Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems.

B. HYDRAULIC AND PNEUMATIC POWER SYSTEMS

- (2) 30. Repair hydraulic and pneumatic power systems components.
- (3) 31. Identify and select hydraulic fluids.
- (3) 32. Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems.

C. CABIN ATMOSPHERE CONTROL SYSTEMS

- (1) 33. [Inspect, check, troubleshoot, service, and repair heating, cooling, air conditioning, pressurization systems, and air cycle machines.]
- (1) 34. Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, and pressurization systems.
- (2) 35. Inspect, check, troubleshoot, service, and repair oxygen systems.

D. AIRCRAFT INSTRUMENT SYSTEMS

- (1) 36. [Inspect, check, service, troubleshoot, and repair electronic flight instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position indicating systems to include the use of built-in test equipment.]
- (2) 37. [Install instruments and perform a static pressure system leak test.]

tronic communication and navigation systems, including VHF passenger address interphones and static discharge devices, aircraft VOR, ILS, LORAN, Radar beacon transponders, flight management computers, and GPWS.】

- (2) 40. Inspect and repair antenna and electronic equipment installations.

F. AIRCRAFT FUEL SYSTEMS

- (1) 41. Check and service fuel dump systems.
- (1) 42. Perform fuel management transfer, and refueling.
- (1) 43. Inspect, check, and repair pressure fueling systems.
- (2) 44. Repair aircraft fuel system components.
- (2) 45. Inspect and repair fluid quantity indicating systems.
- (2) 46. Troubleshoot, service, and repair fluid pressure and temperature warning systems.
- (3) 47. Inspect, check, service, troubleshoot, and repair aircraft fuel systems.

G. AIRCRAFT ELECTRICAL SYSTEMS

- (2) 48. 【Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors.】

- 【(1) 50.b. Inspect, check, and troubleshoot constant speed and integrated speed drive generators.】

H. POSITION AND WARNING SYSTEMS

- 【(2) 51. Inspect, check, and service speed and configuration warning systems, electrical brake controls, and anti-skid systems.】
- (3) 52. 【Inspect, check, troubleshoot, and service landing gear position indicating and warning systems.】

I. ICE AND RAIN CONTROL SYSTEMS

- (2) 53. Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems.

J. FIRE PROTECTION SYSTEMS

- (1) 54. Inspect, check, and service smoke and carbon monoxide detection systems.
- (3) 55. Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.

(Amdt. 147-2, Eff. 5/3/70); 【(Amdt. 147-5, Eff. 9/25/92)】

listed under each subject heading indicates the level of proficiency at which that item must be taught.

I. Powerplant Theory and Maintenance

A. RECIPROCATING ENGINES

*Teaching
level*

- (1) 1. [Inspect and repair a radial engine.]
- (2) 2. Overhaul reciprocating engine.
- (3) 3. [Inspect, check, service, and repair reciprocating engines and engine installations.]
- (3) 4. Install, troubleshoot, and remove reciprocating engines.

B. TURBINE ENGINES

- (2) 5. Overhaul turbine engine.
- ([3]) 6. Inspect, check, service, and repair turbine engines and turbine engine installations.
- ([3]) 7. Install, troubleshoot, and remove turbine engines.

C. ENGINE INSPECTION

- (3) 8. Perform powerplant conformity and air worthiness inspections.

II. Powerplant Systems and Components

A. ENGINE INSTRUMENT SYSTEMS

- (2) 9. [Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems.]
- (3) 10. [Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems.]

B. ENGINE FIRE PROTECTION SYSTEMS

- (3) 11. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.

C. ENGINE ELECTRICAL SYSTEMS

- (2) 12. Repair engine electrical system components.
- (3) 13. Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices.

E. IGNITION AND STARTING SYSTEMS

- (2) 17. Overhaul magneto and ignition harness.
- (2) [18. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components.]
- [(3) 19.a. Inspect, service, troubleshoot, and repair turbine engine electrical starting systems.]
- [(1) 19.b. Inspect, service, and troubleshoot turbine engine pneumatic starting systems.]

F. FUEL METERING SYSTEMS

- (1) 20. [Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls.]
- (2) 21. Overhaul carburetor.
- (2) 22. Repair engine fuel metering system components.
- (3) 23. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.

G. ENGINE FUEL SYSTEMS

- (2) 24. Repair engine fuel system components.
- (3) 25. Inspect, check, service, troubleshoot, and repair engine fuel systems.

H. INDUCTION AND ENGINE AIRFLOW SYSTEMS

- (2) 26. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems.
- (1) 27. Inspect, check, service, troubleshoot and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems.
- (3) 28. Inspect, check, service, and repair carburetor air intake and induction manifolds.

I. ENGINE COOLING SYSTEMS

- (2) 29. Repair engine cooling system components.
- (3) 30. Inspect, check, troubleshoot, service, and repair engine cooling systems.

J. ENGINE EXHAUST AND REVERSER SYSTEMS

- (2) 31. Repair engine exhaust system components.

- tems and components.
- (1) 33. Inspect, check, service, and repair propeller synchronizing and ice control systems.
 - (2) 34. Identify and select propeller lubricants.
 - (1) 35. Balance propellers.
 - (2) 36. Repair propeller control system components.
 - (3) 37. Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems.

【M. AUXILIARY POWER PLANTS

- 【(1) 41. Inspect, check, service, and troubleshoot turbine-driven auxiliary power units.】
- (Amdt. 147-2, Eff. 5/3/70); 【(Amdt. 147-5, Eff. 9/25/92)】

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